Screw-worm

AS FORM 114 (12-61)
UNITED STATES GOVERNMENT

Memorandum

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Entomology Research Division
Kerrville, Texas

SUBJECT: Field tests in Mexico during 1965

TO: W. C. McDuffie, Chief
Insecticides Affecting Man
and Animals Research Branch
Beltsville, Maryland

DATE: January 29, 1965

Enclosed in duplicate are copies of a report of an ecological survey made by Dr. R. B. Davis in southwestern Sonora. Copies of a proposed plan for estimating the effectiveness of sterile fly releases in this same area are also enclosed, along with Thermo-fax copies of a memorandum from Dr. Hightower concerning Dr. Sharman's visit to Mission.

I feel that Dr. Davis obtained a great deal of information about an area with which we have not been familiar, and that he should be commended for this excellent report. Certainly my thinking about the problem of screw-worm eradication in northwestern Mexico has changed, and I feel that information already obtained by Dr. Davis will be very valuable to ADE and the eradication program.

However, the basic problems mentioned in my memorandum of October 20 have not changed. If screw-worms are to be eliminated from the vast area of northern Mexico without building a new sterile fly production plant, it will be necessary to devise a plan for covering Sonora, Baja California, and Sinaloa with minimum numbers of sterile males. I had presumed that this could best be done in the winter, but the information Dr. Davis has obtained indicates that it might be even more feasible to do this in the early summer months.

The research proposal outlined by Dr. Davis appears to me to be very sound. However, as I indicated to Dr. Weidhaas in Little Rock this week, I do not feel that we have adequate local funds to undertake field studies in Mexico during the remainder of this fiscal year. The estimated costs which Dr. Davis mentions are of course very modest, and I feel sure that he would do everything he could to keep costs at a minimum. However, I feel sure that contingencies would develop which would require additional expenditures once the program was started, and that we could not expect to undertake the studies at less expense than was involved in the Poza Rica studies last year. It would be very desirable for us to develop the information about

Entomology Research Division
Kerrville, Texas

Field cases in Mexico during 1957

January 29, 1957

W. G. Merrifie, Chief
Insecticide Screening Man
and Animals Research Branch
Beltsville, Maryland

Enclosed in duplicate are copies of a report of an ecological survey made by Dr. L. R. Davis in southwestern Mexico. Copies of a proposed plan for estimating the effectiveness of sterile fly releases in this same area are also enclosed, along with Thermo-fax copies of a memorandum from Dr. Hightower concerning Dr. Sharman's visit to Mission.

I feel that Dr. Davis obtained a great deal of information about an area with which we have not been familiar, and that he should be commended for this excellent report. Internally my thinking about the problem of screw-worm eradication in northwestern Mexico has changed, and I feel that information already obtained by Dr. Davis will be very valuable to ACI and the eradication program.

However, the basic problems mentioned in my memorandum of October 29 have not changed. If screw-worms are to be eliminated from the vast area of northern Mexico without building a new sterile fly production plant, it will be necessary to devise a plan for covering Sonora, Baja California, and Sinaloa with minimum numbers of sterile males. I had presumed that this could best be done in the winter, but the information Dr. Davis has obtained indicates that it might be even more feasible to do this in the early summer months.

The research proposal outlined by Dr. Davis appears to me to be very good. However, as I indicated to Dr. Wakimoto in little work this week, I do not feel that we have adequate local funds to undertake field studies in Mexico during the remainder of this fiscal year. The estimated costs which Dr. Davis mentions are of course very modest, and I feel sure that he would do everything he could to keep costs at a minimum. However, I feel sure that contingencies would develop which would require additional expenditures once the program was started, and that we could not expect to undertake the studies at less expense than was involved in the Foss Dike eradication last year. It would be very desirable for us to develop the information about

the problems in northwestern Mexico before an expanded program is undertaken by either ADE or an international group. However, we have expended slightly more than 60% of our L/A funds during the first half of the fiscal year, and it will be necessary for us to reduce expenses for the remainder of the year rather than undertake new programs involving additional expenditures.

O H Graham

O. H. Graham
Investigations Leader
Livestock Insects Investigations

Enclosures

cc:
B. G. Hightower

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O. H. Graham
Investigations Leader
Livestock Insects Investigations

Enclosures

cc:
B. G. Hightower

Mr. McDuffie

Entomology Research Division
Kerrville, Texas

Field studies in Mexico

B. G. Hightower
Entomologist in Charge
Livestock Insects Investigations
Mission, Texas

January 29, 1965

Thank you for furnishing me copies of Dr. Davis's report of his findings in Sonora and his proposal for further studies in that area. Both are excellent, and I wish that we were in a position to act promptly on his proposal.

I discussed our financial situation with Dr. Weidhaas in Little Rock this week, and it does not appear that it will be possible for us to obtain supplemental funds this fiscal year. I am hopeful that we may be better able to undertake tests of this type next fiscal year, but it appears that it will be necessary for us to concentrate our effort on research which can be conducted at or near Mission during the balance of this fiscal year.

While I feel that tests in Poza Rica and Sonora are more important, there are a number of very worthwhile lines of research at Mission which can be carried out with a minimum expenditure of funds. We can discuss some of these in more detail in Austin if you would like additional guidance. It appears that the remaining months of this fiscal year will be very critical ones for the research program, as well as for the eradication program, but that we can look forward to expanded activities next year.

O H Graham

O. H. Graham
Investigations Leader
Livestock Insects Investigations

cc:
W. C. McDuffie

Mr. McCuffie

Entomology Research Division
Kerrville, Texas

Field studies in Mexico

January 29, 1965

E. G. Hightower
Entomologist in Charge
Livestock Insects Investigations
Mission, Texas

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O. H. Graham
Investigations Leader
Livestock Insects Investigations

cc:
W. C. McDuffie

AS FORM 114 DEC 1961

JAN 28 1965

UNITED STATES GOVERNMENT

Memorandum

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Entomology Research Division
Mission, Texas

SUBJECT: Discussion with Dr. Sharman on further research in Mexico

TO: O. H. Graham
Investigations Leader
Livestock Insects Investigations
Kerrville, Texas

DATE: January 27, 1965

Dr. Sharman visited here last Monday, and we took the opportunity to discuss further research in Mexico with him and Dr. Gartman. Dr. Gartman is preparing a memorandum on the meeting, but it probably won't be ready for several days.

It was agreed to propose 2 tests of wide swath fly releases in Mexico this season. One test would be conducted on the east coast in Veracruz and the other would be on the west coast near Cuidad Obregon, Sonora. We have been asked to submit detailed proposals on both areas. Dr. Davis is working on these proposals now and we will submit them to you as soon as they are finished.

Mr. Ronald Reed asked about approaching Sr. Ochoa through the Foundation for money from the Mexican ranchers to hire the men needed to conduct the field work. I told him we could take no part in asking either the Foundation or Sr. Ochoa for money, but that we would cooperate in any way possible in using such men if they were hired.

B. G. Hightower

B. G. Hightower
Entomologist in Charge

UNITED STATES GOVERNMENT

Memorandum

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Entomology Research Division
Mission, Texas

SUBJECT: Discussion with Dr. Bateman on further research in Mexico

TO: O. H. Graham
Investigations Leader
Livestock Insects Investigations
Kerrville, Texas

DATE: January 27, 1965

Dr. Bateman visited here last Monday, and we took the opportunity to discuss further research in Mexico with him and Dr. Gertsen. Dr. Gertsen is preparing a memorandum on the meeting, but it probably won't be ready for several days.

It was agreed to propose 2 tests of wide area fly releases in Mexico this season. One test would be conducted on the east coast in Veracruz and the other would be on the west coast near Ciudad Obregon, Sonora. We have been asked to submit detailed proposals on both areas. Dr. Davis is working on these proposals now and we will submit them to you as soon as they are finished.

Mr. Donald Ford asked about approaching Dr. Cobos through the Foundation for money from the Mexican Treasury in view the amount needed to conduct the field work. I told him we could take no part in asking either the Foundation or Dr. Cobos for money, but that we would cooperate in any way possible in using such men if they were hired.

R. G. Rightsmeyer
Entomologist in Charge

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box 986
KERRVILLE, TEXAS
Mission

JAN 25 1965

January 22, 1965

To: G. H. Graham
Investigations Leader
Livestock Insects Investigations
Kerrville, Texas

From: B. G. Hightower
Entomologist in Charge

Subject: Proposed field study on the effectiveness of releases of sterile flies in western Sonora, Mexico

Dr. Davis has proposed the attached project for a series of studies in western Sonora. Admittedly, the objectives are broad and resources few, but we have almost no information on screw-worm populations in this area. We would need your approval of the estimated costs on page 6. The major unknown quantity is the amount of help we can expect from Dr. Mercado, but I may be unduly cynical.

I think the secondary objectives could be deferred until later.

Enclosures (3)

cc:
S. C. Gartman
R. S. Sharman

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box 988
KERRVILLE, TEXAS 78028
Mission

JAN 25 1965

January 22, 1965

To: O. H. Graham
Investigations Leader
Livestock Insects Investigations
Kerrville, Texas

From: E. C. Hightower
Entomologist in Charge

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Enclosures (3)

cc:
S. C. Cartman
R. S. Sharman

Experimental Plan for Estimating the Effectiveness of Sterile Screw-Worm Flies in the Lowlands of Western Sonora, Spring of 1965

by

R. B. Davis

Justification for Experiment.--Three weeks were spent during early January 1965, in checking current and past screw-worm case incidence in the lowlands of western Sonora. Reports of the screw-worm inspectors, interviews with ranchers, Mexican Federal Agricultural Technicians, and inspection of a sample of ranches provided the base data for analysis of situation. Study of climatological, botanical, geological, and topographical data available for the area gave some insight into the causes for the peculiar distribution of screw-worms there.

Results of the study indicate that screw-worms commonly overwinter throughout the lowlands (below 5000 ft) south of the 31st parallel of latitude. Case frequency in winter increases gradually from north to south, until in the frost-free lowlands below the 28th parallel, the winter peak is only slightly lower than the annual peak of the fall months of August and September.

A peculiar micro-habitat, locally called "warm, moist bahia", or "good bahia" (for cattle) seems especially favorable for overwintering of screw-worms and concentration of such cases as may exist at any time of year. The dry, hot months of May, June, and July are usually almost free of cases north of the 28th parallel, with a low incidence to the south

Experimental Plan for Evaluating the Effectiveness of Sterile Screw-
Worm Flies in the Lowlands of Western Sonora, Spring of 1955

by

H. L. Davis

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A peculiar micro-habitat, locally called "warm, moist bahia", or "good bahia" (for cattle) seems especially favorable for overwintering of screw-worms and concentration of such cases as may exist at any time of year. The dry, hot months of May, June, and July are usually almost free of cases north of the 28th parallel, with a low incidence to the south

during the same period. A spring outbreak of small magnitude in March, April and early May is usually experienced throughout the lowlands, but is confined primarily within the widely scattered sites of the good bahias. The fall peak of cases spreads out over most of the lowlands coincident with the fall rains (95% of annual rainfall in August and September) and the attendant dispersion of cattle out from the good bahias.

On the basis of these data, it seems imperative that the screw-worm situation in these lowlands be assessed more specifically, especially with reference to the effect of sterile fly drops.

The northern portion of the lowlands, down to the 28th parallel, have been receiving sporadic, widely dispersed drops of sterile flies, as evidenced by the presence of fly boxes on the ranches visited. No clear correlations between incidence of drops and incidence of cases were evident, so a systematic study of this point is in order. Then, a comparison of data from the drop area with similar data from south of the area should yield estimates of the rate at which the problem escalates toward the south where year-round screw-worm incidence is reported. Correlations between the patterns of seasonal incidence in these coastal lowlands with those from the intermountain region of northeast Sonora and northwest Chihuahua should yield clues concerning possible migration of fertile flies from the coastal lowlands into the mountains. Demonstration of the part played by the coastal lowlands in the overall picture will provide the basis for efficient control of the whole western part of Mexico. Until this picture can be described and understood, many sterile flies are doomed to be wasted in any effort at overall control through use of grids of releases.

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On the basis of these data, it seems imperative that the screw-worm situation in these lowlands be assessed more specifically, especially with reference to the effect of sterile fly drops.

The northern portion of the lowlands, down to the 26th parallel, have been receiving sporadic, widely dispersed drops of sterile flies, as evidenced by the presence of fly boxes on the ranches visited. No clear correlations between incidence of drops and incidence of cases were evident, so a systematic study of this point is in order. Then, a comparison of data from the drop area with similar data from south of the area should yield estimates of the rate at which the problem escalates toward the south where year-round screw-worm incidence is reported. Correlations between the patterns of seasonal incidence in these coastal lowlands with those from the intermountain region of northeast Sonora and northwest Chihuahua should yield clues concerning possible migration of fertile flies from the coastal lowlands into the mountains. Demonstration of the part played by the coastal lowlands in the overall picture will provide the basis for efficient control of the whole western part of Mexico. Until this picture can be described and understood, many sterile flies are doomed to be wasted in any effort at overall control through use of grids of releases.

A corollary justification for instituting studies in this area this spring is that both the cattlemen and the Mexican Government personnel in the area are eager and willing to help us. Cattlemen have agreed to donate animals for use in collecting egg masses from active screw-worm wounds, the pens, the feed and water for the animals, and ranch personnel to care for them and to collect the egg masses. The Regional Federal Veterinarian for Sonora, Dr. Mungia Mercado, is prepared to run one of our lines of fly traps and bait animals if we will pay for his gasoline and meal costs. He has the concurrence of his immediate supervisor and of the agricultural sub-secretary for cattle in making this offer. There is an American citizen, recently retired from the U.S. Army at about 45 years of age residing near Navojoa who is interested in part-time work with us in conducting our experiments. He has worked in California in trapping fruit flies. We are presently in correspondence with him to see what conditions for using him will be mutually suitable.

Objectives:

I. Primary Objectives:

A. To determine the seasonal patterns of screw-worm fly incidence in the coastal lowlands of Sonora, up to 4000 ft.

1. To determine the peaks and lows of adult, native fly incidence.

2. To determine the relationship of adult fly incidence to numbers of egg masses laid on wounds of test animals.

3. To compare the patterns in the northern portion with those in the southern portion of the Sonoran lowlands.

B. To survey the severity of screw-worm cases down the Mexican coast through Sinaloa and Nayarit to the 21st parallel, thence east through the valley of the Rio Grande de Santiago to north of Guadalajara, thence north-

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3. To compare the patterns in the northern portion with those in the southern portion of the Sonoran lowlands.

B. To survey the severity of screw-worm cases down the Mexican coast through Sinaloa and Nayarit to the 21st parallel, thence east through the valley of the Rio Grande de Santiago to north of Guadalajara, thence north-

east to the vicinity of the cities of Aguas Calientes and Zacatecas.

1. To survey and report on the numbers and kinds of livestock along the survey line, as well as the locations of livestock with respect to geography, climate, and land use practices.

2. To survey the records and local knowledge of the patterns of screw-worm incidence.

3. To establish a line of ranches at about 50 mile intervals along the survey line, each sending in routine samples of larvae from wounded animals, estimates of total numbers and kinds of animals with larvae in wounds, and estimates of total numbers of animals inspected.

4. To compare the patterns in a series of typical "good bahias" with those in a series of "altos", or uplands in order to determine how important the good bahias are to the screw-worm in coastal Sonora.

C. To seek correlations between the patterns in the lowlands and those being reported in the mountains to the northeast

II. Secondary Objectives: (If funds and facilities permit)

A. To compare the patterns of adult fly and fertile egg mass incidence on trap lines over which sterile flies are dropped with those on trap lines with only native flies in the vicinity.

1. To determine how far the sterile flies will move and be effective in reducing fertility of native flies.

2. To determine how effective sterile flies are in the near vicinity of traps and test animals.

<u>Procedures:</u>

<u>Objective I.</u>

A. All four items under Objective I-A will be pursued through

east to the vicinity of the cities of Aguas Calientes and Zacatecas.

1. To survey and report on the numbers and kinds of livestock along the survey line, as well as the locations of livestock with respect to geography, climate, and land use practices.

2. To survey the records and local knowledge of the patterns of screw-worm incidence.

3. To establish a line of ranches at about 50 mile intervals along the survey line, each scouting in routine samples of larvae from wounded animals, estimates of total numbers and kinds of animals with larvae in wounds, and estimates of total numbers of animals inspected.

4. To compare the patterns in a series of typical "good habitat" with those in a series of "altos", or uplands in order to determine how important the good habitat are to the screw-worm in coastal Sonora.

C. To seek correlations between the patterns in the lowlands and those being reported in the mountains to the northeast

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1. To determine how far the sterile flies will move and be effective in reducing fertility of native flies.

2. To determine how effective sterile flies are in the near vicinity of traps and test animals.

Procedures:

Objective I.

A. All four items under Objective I-A will be pursued through

establishment of two trap and bait-animal lines in Sonora.

Three general types of terrain will be sampled (see fig. 1). The one west of Hermosillo represents the desert plains type near sea level where hills and mountains are infrequent and rainfall is generally less than 5 inches a year. The second type just southeast of Hermosillo is in the middle elevation, mixed altos and bahias type, where annual rainfall is between 5 and 10 inches per year. The third is in the mountain foothills at elevations above 3000 ft and rainfall about 15 inches per year.

In each type, a trap and a wounded animal will be maintained down in one of the good bahias, another trap-animal pen will be maintained in a nearby high elevation -- at least 900 feet above the set in the bahia.

Ranchers at each of the locations have been contacted and promise full cooperation as outlined in a justification section. Dr. Mungia Mercado will run this line at least twice a week, if we can furnish his gasoline and meals.

A similar line with 3 sets of 2 sites each will be established on a line through Navojoa, as indicated in fig. 1. The ranchers promise the same cooperation here as along the Hermosillo line. This line is well below any previous drops of sterile flies, while that at Hermosillo lies in an area previously treated in a sporadic fashion. If only the Primary Objectives of this plan are to be pursued, then it is my emphatic request that neither area, within a distance of at least 40 miles from any trap site, be treated any longer with sterile flies until after the

establishment of two trap and bait-animal lines in Sonora.

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In each type, a trap and a wounded animal will be maintained down in one of the good bahias, another trap-animal pen will be maintained in a nearby high elevation -- at least 500 feet above the set in the bahia.

Ranchers at each of the locations have been contacted and promise full cooperation as outlined in a justification section. Dr. Manuel Moreado will run this line at least twice a week, if we can furnish his gasoline and meals.

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experiment is concluded. It is my desire to run the experiment for at least 3 months in spring, or until the summer low of flies is evident; then another 4 months (August, September, October, and November) until the fall peak of flies is past.

The field cost of this experiment will run about $150 per month for the Hermosillo line, using Dr. Mungia Mercado as the technician, and allowing 15 mi/gal on his vehicle and $5 per day afield for his food. For the Najojoa line the cost will be about $100 per month for vehicle and meals for the technician. The salary of this technician, if he can be hired for 2 or 3 days per week, will be in the neighborhood of $125 per month. Thus, the cost of the spring run for both lines will total about $1025, the fall run about $1500. This estimate does not include the cost of the principal investigator, whose costs afield have been running about $450 per month. However, in addition to supervising the above research, he plans to be pursuing the survey of screw-worm conditions down the coast of Sinaloa and Nayarit.

B. The elements of this objective will be pursued by the principal investigator, with whatever cooperation from the staff of the screw-worm inspectors as may become available. Senor Javies Sanchez Gavito, Information Officer on Dr. Sharman's staff, has expressed a desire to visit the ranchers in Sinoloa and Nayarit to look into their interest in the screw-worm program. and has offered to make his trip coincide with my first one. Dr. Sharman has, under advisement, my request for loan of one of his inspectors to go with me on the first trip through the area. Dr. Sharman has expressed willingness to handle the extra screw-worm samples that will come in from the survey area.

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The field cost of this experiment will run about $130 per month for the Hermosillo line, using Dr. Mungia Moreno as the technician, and allowing $5 vol/gal on his vehicle and $5 per day afield for his food. For the Majoja line the cost will be about $100 per month for vehicle and meals for the technician. The salary of this technician, if he can be hired for 2 or 3 days per week, will be in the neighborhood of $125 per month. Thus, the cost of the spring run for both lines will total about $1025, the fall run about $1500. This estimate does not include the cost of the principal investigator, whose costs afield have been running about $450 per month. However, in addition to supervising the above research, he plans to be pursuing the survey of screw-worm conditions down the coast of Sinaloa and Nayarit.

B. The elements of this objective will be pursued by the principal investigator, with whatever cooperation from the staff of the screw-worm inspectors as may become available. Senor Jesus Sanchez Davila, Information Officer on Dr. Sherman's staff, has expressed a desire to visit the ranchers in Sinaloa and Nayarit to look into their interest in the screw-worm program, and has offered to make his trip coincide with my first one. Dr. Sherman has, under advisement, my request for loan of one of his inspectors to go with me on the first trip through the area. Dr. Sherman has expressed willingness to handle the extra screw-worm samples that will come in from the survey area.

C. This objective will be pursued through statistical analysis of all available field data, employing primarily the method of mapping isohyetes of screw-worm cases.

Objective II

A. If approved, this objective will require, at minimum, the systematic dispersal of sterile flies near the 2 lines of trap-animal sites. Under minimal investment plans, the systematic drops could be made on 8 mile swaths over the area occupied by each line of test sites, starting on lines 4 miles north and south of a line through the test sites so that effects at the test sites would be those accomplished by sterile flies having had to move the maximum distance to reach the tests. If this were the only use made of sterile flies, then it would be very important that ranches both under the drop area and well out to either side be urged to keep close check on their stock and submit samples of larvae from all known cases. These data could then provide the base line for comparing our data with conditions over the general area.

Under optimal experimental conditions, but at added cost, two lines of test sites should be set near Hermosilla instead of only one, and two should be set up also in the Navojoa area. Then, with adequate separation (40 miles) between pairs of lines, one line (upwind) could be covered with sterile flies, the other would be the check.

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NOGALES
NUEVO CASAS GRANDES
La Libertad
ISLA ANGEL DE LA GUARDA
ISLA TIBURÓN
HERMOSILLO
Madera
CIUDAD OBREGÓN
Navojoa
LOS MOCHIS
Pozo Lora
Santa Rosalía
Rosarito
San Bernardo
Las Delicias
CALIFORNIA
112°E
110°
109° M
111° K
Lambert Conformal Conic Projection
Standard Parallels 37° and 65°
Convergence Factor .78535
World Aeronautical Chart
series indicated thus
Pairs of sites at which fly traps and bait animals will be placed

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box ~~XXX~~ 986
~~KERRVILLE, TEXAS 78028~~
Mission

JAN 22 1965

January 21, 1965

To: O. H. Graham
Investigations Leader
Livestock Insects Investigations
Kerrville, Texas

From: B. G. Mightower
Entomologist in Charge

Subject: Ecological survey of southwestern Sonora, Mexico, by R. B. Davis

Dr. Davis has completed a preliminary survey of the screw-worm situation in southwestern Sonora, Mexico.

I would like to reinforce his recommendation that sterile flies be released on known or suspected concentrations of cases on a priority basis. We do not have enough information on the seasonal abundance or local distribution of screw-worms in this extensive area to make more specific recommendations.

Enclosures (3)

CC:
R. S. Sharman
S. C. Gartman

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box 588
MCALLEN, TEXAS 78501
Mission

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Report of the Apparent Character of the Screw-Worm Problem in the Coastal Regions of Sonora

by

R. B. Davis

Throughout the coastal area of Sonora, bounded roughly by 113°,30°30'; 111°,30°30'; 110°40', 29°30'; 110°,28°30'; 108°30', 26°30'; as outlined on the accompaning map, screw-worm flies are known to overwinter. The same is true for the peninsula of Baja, California, below the 30th parallel of latitude. It seems likely, on the basis of reports from ranchers and screw-worm inspectors, that sporadic screw-worm overwintering occurs in Mexico north of 30°30'N and west of 111°W in very mild winters. The winter of 1964-65, up to mid January, has been one of the mildest winters in the memory of local ranchers, and screw-worms have generally been worse this winter in the entire coastal area than for the past three to six winters.

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Along the northeast border of the region, roughly above the 28th parallel, the inter-mountain bahias seem seldom to have had cases in cold winters, but often did in mild winters. It is not clear how far into the bahias of the Sierra Madres Occidentales this situation extended. Very few cases are being reported this winter west of the 109°W long. between the 28° and 29° lat. where

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Below the 28th parallel along the western slopes of the high mountains, the inter-mountain bahias are reported as traditionally having some winter screw-worm cases. Certain bahias in this region as high as 4000 ft in the mountains are reported as never having frost. Frost is rare, apparently, in the coastal regions below 2000 ft altitude and south of the 28th parallel. Several different ranchers in these lowlands summed up the screw-worm situation by saying that no matter what time of year, or in what kind of weather, any new-born calf left untreated would have a serious, usually fatal case of navel worms within 3 to 4 days.

In summary of the winter incidence of screw-worms from the eastern slopes of the western Sierra to the coast in Sonora the following is offered:

North of about the 28th parallel, winter cold reduces the areal extent of cases, but does not eliminate them. It only confines them to certain, most favorable sites locally called warm, moist bahias. These sites are found widely scattered throughout the coastal area, and even well into the higher mountains. In severe winters (severe cold) few cases are expected. In mild winters (probably without frosts) a few cases are to be expected most anywhere,

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but the favored bahias usually have most of them.

South of the 28th parallel frost is apparently non-existent below 2000 ft altitude, and certain warm, moist bahias well up into the high mountains rarely have frost. Screw-worms are common year-round in these southern lowlands, persisting high into the inter-mountain valleys (up to 4000 ft) in mild winters.

The warm, moist bahias, known to the local ranchers as the best places for cattle in summer or winter, are not easily recognized as such by the novice, except possibly on the basis of the vegetation in them. They cannot be defined on the basis of surface water in the region under discussion. The only year-round standing water is behind man-made dams at Hermosillo on the Rio Sonora, above Ciudad Obregon on the Yaqui River, and east of Navojoa on the Rio Mayo. The irrigation canals below these dams and the rivers behind them have flowing water almost year-round, but there is no evidence of more screw-worm cases near any of these waters than elsewhere far from them.

Few, if any, bahias have artificial tanks that hold water more than 2 or 3 months. The vast majority of stock water comes from deep wells, and very few of these wells have windmills or pumps and water is drawn by hand.

The favored bahias cannot be defined on the basis of general patterns of rainfall, except that these bahias may be more abundant to the east toward the upper, western slopes of the high mountains where rainfall is highest, though not abundant (800 mm total annual = 21.5").

A necessary characteristic of the warm, moist type of bahia seems to be that it be more or less enclosed by hills or mountains. However, not all such enclosed pockets are warm and moist, according to the local ranchers. My analysis of this factor is that the encircling promontories provide a bowl

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within which air is trapped for long periods of time. The cooler air of the surrounding uplands tends to subside into the bowl at night, mixing with the hot air inside and thereby increasing the relative humidity, frequently causing a dew -- an uncommon phenomenon in this general region. During the day the heated air in the bowl does not rise sufficiently to escape in large amounts, so what moisture it contains is held within. Thus, these bowls tend to yield much of their moisture, in the long run, back to the ground and plant surface inside themselves, conserving it against loss to the outside.

The dominant vegetation in the few favored bahias inspected was of the desert, deciduous-bush and tree type, but the trees were larger, more dense, and green compared to trees of the same species elsewhere in the region. The ranchers reported that this is always true in the good bahias, and that in the best of them there are even some broad-leafed trees present. The presence of more vigorous, less xeric growth forms in the vegetation of the good bahias suggests what the key factor may be. The physical effect of the bowl could not indefinitely conserve the moisture inside against a desert climate where highest relative humidities are below 60% and averages are less than 40%. The bowl effect could tip the scales in favor of more verdant vegetation if the roots of the vegetation had available a steady supply of ground water. I believe a good bahia is one within a ring of hills that prevents rapid exchange of air with the outside and beneath which there is enough ground water to subirrigate the deep rooted trees. The trees thus

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pump up the water and pass it to the bowl of air via evapo-transpiration processes and the bowl conserves it. This eventually produces a microcosm with higher overall average humidities, and much higher nighttime humidities --enough higher to maintain a long term moisture equilibrium state much above the open terrain outside the bowls. Proof that there is an interplay between the bowl shape and the underground water lies in the fact that without the bowl, the vegetation in several places where ground water was known to be available to deep rooted trees did not produce the vigorous forest seen in the good habias. In fact, it appears that goodly supplies of ground water for deep rooted plants are widely available. Perhaps without these supplies this desert climate would support little natural life; whereas desert scrub-thorn forest is the average aspect of the vegetation everywhere and cattle seem to find sustenance throughout the region. A Professor of Botany and Range Management at the University of Sonora, Mr. Donald Johnson, said that his studies show that cattle eat much more of the desert scrub and cactus foliage in this region, and can maintain themselves on it better than in the Sonoran desert areas of the Southwest United States. Perhaps the added succulence of the vegetation drawn from the ground waters is what makes possible the cattle industry of the region.

The forgoing discussion of the good bahias is not to indicate that overall there are no effects from temperature and rainfall. Throughout the region the peak of rain fall comes in late August to early September, with over 95% of the annual amount falling in this period. This is the period of peak incidence of screw-worms, lasting sometimes into November.

Annual totals for rainfall range from less than 5 inches near Caborca to about 15 to 20 inches to the east in the high mountains and about 10 to 15 inches to the south on the coast below Navojoa. The vegetation aspect reflects these variations. Saguaro cactus, creosote bush and a desert legume tree (Cladurat) dominate in the dry north coast. Organ cactus and mesquite begin to increase in abundance toward the south and south east, until they replace the desert dominants south and east of Guaymas. Near Navojoa, mesquite dominates in nearly solid stands in the best watered sites (ground water) and broad leafed trees are common at higher altitudes in the bahias. On all of the upper slopes of the hills and mountains of the coastal region, below altitudes of 3000 ft, no broad leafed forest is found, these uplands being vegetated by desert scrub with generally more grass species than the lowlands. Grasses generally are sparse everywhere, probably due more to overgrazing than to climate.

Caborca averages 30 days per year below 32° F, Hermosillo 3 days, Guaymas 1 day, and Ciudad Obregon none, according to records made available by Dr. Juan Mas Ginta, Director of the Mexican Federal Department of Geography and Meteorology.

Rainfall and temperature thus create a gradual shift from true desert in the northwest toward semidesert in the south and east of the region under discussion. Thorn scrub-woods are present throughout is remarkable, and may be due primarily to the many good bahias that form oases of high humidity. The presence almost everywhere of ground water for plant life may be what makes the area tolerable to livestock.

The problem of treating this region with sterile flies would be relatively simple if the good bahias were distributed in some orderly fashion, but such is not the case. The region is much more irregular in surface topography than is indicated by most maps, being best described as a hilly to mountainous desert with a few seacoast plains interspersed. Moreover, the alignment of the uplands is not uniformly northwest southeast, as suggested by most maps. The presence of much crystaline, metamorphic rock, igneous rock and lava, with little limestone, sandstone, or shale indicates that the mountains of the region were developed by severe magmatic upheavals. What appear on maps to be long fault lines of sedimentary fracture ridges are seen on the ground as chaotic mixtures of old volcanic bowls, basaltic extrusions, slips and folds, and lava mantles.

The rule in predicting just which pile of rock will have in it a good bahia is, that one can't predict. Yet, piles of rock are everywhere except in the plains coastward below Hermosillo, Ciudad Obregon, and Navojoa, and a bowl within a pile of rock no higher than 800-900 ft may be one of the good bahias. The bahias are not always obvious bowls in shape wither. One may be a long, sloping box canyon between two mountains; another may be a broad, shallow swale with low hills surrounding; a third may be the rock jumbled floor of an ancient, low-crowned volcano crater.

My suggestion is, that during late July, when it is still hot and dry the actual location of the cattle should be visible from the air, when the cattle are concentrated mostly in the good bahias, each cattle concentration could be treated. Whether our sterile flies can tolerate the temperature of

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Standard Parallels 37° and 65°
Convergence Factor .78535

AS FORM 114 DEC 1961

UNITED STATES GOVERNMENT

Memorandum

JAN 29 1965

Screw-worm

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Entomology Research Division
Mission, Texas

SUBJECT: Discussion with Dr. Sharman on further research in Mexico

Insects Affecting Man & Animals
FEB 1 1965
R
~~W.C.M.~~
~~D.E.W.~~
~~J.A.F.~~

File

TO: O. H. Graham
Investigations Leader
Livestock Insects Investigations
Kerrville, Texas

DATE: January 27, 1965

Duplicate. orig to ESRK

Dr. Sharman visited here last Monday, and we took the opportunity to discuss further research in Mexico with him and Dr. Gartman. Dr. Gartman is preparing a memorandum on the meeting, but it probably won't be ready for several days.

It was agreed to propose 2 tests of wide swath fly releases in Mexico this season. One test would be conducted on the east coast in Veracruz and the other would be on the west coast near Cuidad Obregon, Sonora. We have been asked to submit detailed proposals on both areas. Dr. Davis is working on these proposals now and we will submit them to you as soon as they are finished.

Mr. Ronald Reed asked about approaching Sr. Ochoa through the Foundation for money from the Mexican ranchers to hire the men needed to conduct the field work. I told him we could take no part in asking either the Foundation or Sr. Ochoa for money, but that we would cooperate in any way possible in using such men if they were hired.

B. G. Hightower

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UNITED STATES GOVERNMENT

Memorandum

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Entomology Research Division
Mission, Texas

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AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box 986
KERRVILLE, TEXAS
Mission

JAN 22 1965

January 21, 1965

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ENTOMOLOGY RESEARCH DIVISION
P. O. Box 969
MISSIONARY, TEXAS 78596
Mission

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Below the 28th parallel along the western slopes of the high mountains, the inter-mountain bahias are reported as traditionally having some winter screw-worm cases. Certain bahias in this region as high as 4000 ft in the mountains are reported as never having frost. Frost is rare, apparently, in the coastal regions below 2000 ft altitude and south of the 28th parallel. Several different rancheros in these lowlands summed up the screw-worm situation by saying that no matter what time of year, or in what kind of weather, any new-born calf left untreated would have a serious, usually fatal case of naval worms within 3 to 4 days.

In summary of the winter incidence of screw-worms from the eastern slopes of the western Sierra to the coast in Sonora the following is offered:

North of about the 28th parallel, winter cold reduces the areal extent of cases, but does not eliminate them. It only confines them to certain, most favorable sites locally called warm, moist bahias. These sites are found widely scattered throughout the coastal area, and even well into the higher mountains. In severe winters (severe cold) few cases are expected. In mild winters (probably without frosts) a few cases are to be expected most anywhere,

but the favored bahias usually have most of them.

South of the 28th parallel frost is apparently non-existent below 2000 ft altitude, and certain warm, moist bahias well up into the high mountains rarely have frost. Screw-worms are common year-round in these southern lowlands, persisting high into the inter-mountain valleys (up to 4000 ft) in mild winters.

The warm, moist bahias, known to the local ranchers as the best places for cattle in summer or winter, are not easily recognized as such by the novice, except possibly on the basis of the vegetation in them. They cannot be defined on the basis of surface water in the region under discussion. The only year-round standing water is behind man-made dams at Hermosillo on the Rio Sonora, above Ciudad Obregon on the Yaqui River, and east of Navojoa on the Rio Mayo. The irrigation canals below these dams and the rivers behind them have flowing water almost year-round, but there is no evidence of more screw-worm cases near any of these waters than elsewhere far from them.

Few, if any, bahias have artificial tanks that hold water more than 2 or 3 months. The vast majority of stock water comes from deep wells, and very few of these wells have windmills or pumps and water is drawn by hand.

The favored bahias cannot be defined on the basis of general patterns of rainfall, except that these bahias may be more abundant to the east toward the upper, western slopes of the high mountains where rainfall is highest, though not abundant (800 mm total annual = 21.5").

A necessary characteristic of the warm, moist type of bahia seems to be that it be more or less enclosed by hills or mountains. However, not all such enclosed pockets are warm and moist, according to the local ranchers. My analysis of this factor is that the encircling promontories provide a bowl

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within which air is trapped for long periods of time. The cooler air of the surrounding uplands tends to subside into the bowl at night, mixing with the hot air inside and thereby increasing the relative humidity, frequently causing a dew -- an uncommon phenomenon in this general region. During the day the heated air in the bowl does not rise sufficiently to escape in large amounts, so what moisture it contains is held within. Thus, these bowls tend to yield much of their moisture, in the long run, back to the ground and plant surface inside themselves, conserving it against loss to the outside.

The dominant vegetation in the few favored bahias inspected was of the desert, deciduous-bush and tree type, but the trees were larger, more dense, and green compared to trees of the same species elsewhere in the region. The ranchers reported that this is always true in the good bahias, and that in the best of them there are even some broad-leafed trees present. The presence of more vigorous, less xeric growth forms in the vegetation of the good bahias suggests what the key factor may be. The physical effect of the bowl could not indefinitely conserve the moisture inside against a desert climate where highest relative humidities are below 60% and averages are less than 40%. The bowl effect could tip the scales in favor of more verdant vegetation if the roots of the vegetation had available a steady supply of ground water. I believe a good bahia is one within a ring of hills that prevents rapid exchange of air with the outside and beneath which there is enough ground water to subirrigate the deep rooted trees. The trees thus

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pump up the water and pass it to the bowl of air via evapo-transpiration processes and the bowl conserves it. This eventually produces a microcosm with higher overall average humidities, and much higher nighttime humidities --enough higher to maintain a long term moisture equilibrium state much above the open terrain outside the bowls. Proof that there is an interplay between the bowl shape and the underground water lies in the fact that without the bowl, the vegetation in several places where ground water was known to be available to deep rooted trees did not produce the vigorous forest seen in the good habias. In fact, it appears that goodly supplies of ground water for deep rooted plants are widely available. Perhaps without these supplies this desert climate would support little natural life; whereas desert scrub-thorn forest is the average aspect of the vegetation everywhere and cattle seem to find sustenance throughout the region. A Professor of Botany and Range Management at the University of Sonora, Mr. Donald Johnson, said that his studies show that cattle eat much more of the desert scrub and cactus foliage in this region, and can maintain themselves on it better than in the Sonoran desert areas of the Southwest United States. Perhaps the added succulence of the vegetation drawn from the ground waters is what makes possible the cattle industry of the region.

The forgoing discussion of the good bahias is not to indicate that overall there are no effects from temperature and rainfall. Throughout the region the peak of rain fall comes in late August to early September, with over 95% of the annual amount falling in this period. This is the period of peak incidence of screw-worms, lasting sometimes into November.

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Annual totals for rainfall range from less than 5 inches near Caborca to about 15 to 20 inches to the east in the high mountains and about 10 to 15 inches to the south on the coast below Navojoa. The vegetation aspect reflects these variations. Saguaro cactus, creosote bush and a desert legume tree (Ondura?) dominate in the dry north coast. Organ cactus and mesquite begin to increase in abundance toward the south and south east, until they replace the desert dominants south and east of Guaymas. Near Navojoa, mesquite dominates in nearly solid stands in the best watered sites (ground waters) and broad leafed trees are common at higher altitudes in the bahias. On all of the upper slopes of the hills and mountains of the coastal region, below altitudes of 5000 ft, no broad leafed forest is found, these uplands being vegetated by desert scrub with generally more grass species than the lowlands. Grasses generally are sparse everywhere, probably due more to overgrazing than to climate.

Caborca averages 30 days per year below 32° F, Hermosillo 3 days, Guaymas 1 day, and Cuidad Obregon none, according to records made available by Dr. Juan Mas Sinta, Director of the Mexican Federal Department of Geography and Meterology.

Rainfall and temperature thus create a gradual shift from true desert in the northwest toward semidesert in the south and east of the region under discussion. That screw-worms are present throughout is remarkable, and may be due primarily to the many good bahias that form oases of high humidity. The presence almost everywhere of ground water for plant life may be what makes the area tolerable to livestock.

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The problem of treating this region with sterile flies would be relatively simple if the good bahias were distributed in some orderly fashion, but such is not the case. The region is much more irregular in surface topography than is indicated by most maps, being best described as a hilly to mountainous desert with a few seacoast plains interspersed. Moreover, the alignment of the uplands is not uniformly northwest southeast, as suggested by most maps. The presence of much crystaline, metamorphic rock, igneous rock and lava, with little limestone, sandstone, or shale indicates that the mountains of the region were developed by severe magmatic upheavals. What appear on maps to be long fault lines of sedimentary fracture ridges are seen on the ground as chaotic mixtures of old volcanic bowls, basaltic extrusions, slips and folds, and lava mantles.

The rule in predicting just which pile of rock will have in it a good bahia is, that one can't predict. Yet, piles of rock are everywhere except in the plains coastward below Hermosillo, Ciudad Obregon, and Navojoa, and a bowl within a pile of rock no higher than 800-900 ft may be one of the good bahias. The bahias are not always obvious bowls in shape wither. One may be a long, sloping box canyon between two mountains; another may be a broad, shallow swale with low hills surrounding; a third may be the rock jumbled floor of an ancient, low-crowned volcano crater.

My suggestion is, that during late July, when it is still hot and dry the actual location of the cattle should be visible from the air, when the cattle are concentrated mostly in the good bahias, each cattle concentration could be treated. Whether our sterile flies can tolerate the temperature of

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MEXICO
UNITED STATES
NUEVO CASAS GRANDES
HERMOSILLO
CIUDAD OBREGON
LOS MOCHIS
Navojoa
Santa Rosalia
Loreto
La Paz
Cabo San Lucas
GV 100°
109°
110°
111°
112°E
Lambert Conformal Conic Projection
Standard Parallels 37° and 65°
Convergence Factor .78535
FOLD TO JNC CHARTS

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box 986
KERRVILLE, TEXAS
Mission

JAN 25 1965

January 22, 1965

To: O. H. Graham
Investigations Leader
Livestock Insects Investigations
Kerrville, Texas

From: B. G. Hightower
Entomologist in Charge

Subject: Proposed field study on the effectiveness of releases of sterile flies in western Sonora, Mexico

Dr. Davis has proposed the attached project for a series of studies in western Sonora. Admittedly, the objectives are broad and resources few, but we have almost no information on screw-worm populations in this area. We would need your approval of the estimated costs on page 6. The major unknown quantity is the amount of help we can expect from Dr. Mercado, but I may be unduly cynical.

I think the secondary objectives could be deferred until later.

Enclosures (3)

cc:
S. C. Gartman
R. S. Sharman

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AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box 888, 98b
KERRVILLE, TEXAS 78028
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Experimental Plan for Estimating the Effectiveness of Sterile Screw-Worm Flies in the Lowlands of Western Sonora, Spring of 1965

by

R. B. Davis

Justification for Experiment.--Three weeks were spent during early January 1965, in checking current and past screw-worm case incidence in the lowlands of western Sonora. Reports of the screw-worm inspectors, interviews with ranchers, Mexican Federal Agricultural Technicians, and inspection of a sample of ranches provided the base data for analysis of situation. Study of climatological, botanical, geological, and topographical data available for the area gave some insight into the causes for the peculiar distribution of screw-worms there.

Results of the study indicate that screw-worms commonly overwinter throughout the lowlands (below 5000 ft) south of the 31st parallel of latitude. Case frequency in winter increases gradually from north to south, until in the frost-free lowlands below the 28th parallel, the winter peak is only slightly lower than the annual peak of the fall months of August and September.

A peculiar micro-habitat, locally called "warm, moist bahia", or "good bahia" (for cattle) seems especially favorable for overwintering of screw-worms and concentration of such cases as may exist at any time of year. The dry, hot months of May, June, and July are usually almost free of cases north of the 28th parallel, with a low incidence to the south

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A peculiar micro-habitat, locally called "warm, moist habit", or "good habit" (for cattle) seems especially favorable for overwintering of screw-worms and concentration of such cases as may exist at any time of year. The dry, hot months of May, June, and July are usually almost free of cases north of the 28th parallel, with a low incidence to the south

during the same period. A spring outbreak of small magnitude in March, April and early May is usually experienced throughout the lowlands, but is confined primarily within the widely scattered sites of the good bahias. The fall peak of cases spreads out over most of the lowlands coincident with the fall rains (95% of annual rainfall in August and September) and the attendant dispersion of cattle out from the good bahias.

On the basis of these data, it seems imperative that the screw-worm situation in these lowlands be assessed more specifically, especially with reference to the effect of sterile fly drops.

The northern portion of the lowlands, down to the 28th parallel, have been receiving sporadic, widely dispersed drops of sterile flies, as evidenced by the presence of fly boxes on the ranches visited. No clear correlations between incidence of drops and incidence of cases were evident, so a systematic study of this point is in order. Then, a comparison of data from the drop area with similar data from south of the area should yield estimates of the rate at which the problem escalates toward the south where year-round screw-worm incidence is reported. Correlations between the patterns of seasonal incidence in these coastal lowlands with those from the intermountain region of northeast Sonora and northwest Chihuahua should yield clues concerning possible migration of fertile flies from the coastal lowlands into the mountains. Demonstration of the part played by the coastal lowlands in the overall picture will provide the basis for efficient control of the whole western part of Mexico. Until this picture can be described and understood, many sterile flies are doomed to be wasted in any effort at overall control through use of grids of releases.

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A corollary justification for instituting studies in this area this spring is that both the cattlemen and the Mexican Government personnel in the area are eager and willing to help us. Cattlemen have agreed to donate animals for use in collecting egg masses from active screw-worm wounds, the pens, the feed and water for the animals, and ranch personnel to care for them and to collect the egg masses. The Regional Federal Veterinarian for Sonora, Dr. Mungia Mercado, is prepared to run one of our lines of fly traps and bait animals if we will pay for his gasoline and meal costs. He has the concurrence of his immediate supervisor and of the agricultural sub-secretary for cattle in making this offer. There is an American citizen, recently retired from the U.S. Army at about 45 years of age residing near Navojoa who is interested in part-time work with us in conducting our experiments. He has worked in California in trapping fruit flies. We are presently in correspondence with him to see what conditions for using him will be mutually suitable.

Objectives:

I. Primary Objectives:

A. To determine the seasonal patterns of screw-worm fly incidence in the coastal lowlands of Sonora, up to 4000 ft.

1. To determine the peaks and lows of adult, native fly incidence.

2. To determine the relationship of adult fly incidence to numbers of egg masses laid on wounds of test animals.

3. To compare the patterns in the northern portion with those in the southern portion of the Sonoran lowlands.

B. To survey the severity of screw-worm cases down the Mexican coast through Sinaloa and Nayarit to the 21st parallel, thence east through the valley of the Rio Grande de Santiago to north of Guadalajara, thence north-

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east to the vicinity of the cities of Aguas Calientes and Zacatecas.

1. To survey and report on the numbers and kinds of livestock along the survey line, as well as the locations of livestock with respect to geography, climate, and land use practices.

2. To survey the records and local knowledge of the patterns of screw-worm incidence.

3. To establish a line of ranches at about 50 mile intervals along the survey line, each sending in routine samples of larvae from wounded animals, estimates of total numbers and kinds of animals with larvae in wounds, and estimates of total numbers of animals inspected.

4. To compare the patterns in a series of typical "good bahias" with those in a series of "altos", or uplands in order to determine how important the good bahias are to the screw-worm in coastal Sonora.

C. To seek correlations between the patterns in the lowlands and those being reported in the mountains to the northeast

II. Secondary Objectives: (If funds and facilities permit)

A. To compare the patterns of adult fly and fertile egg mass incidence on trap lines over which sterile flies are dropped with those on trap lines with only native flies in the vicinity.

1. To determine how far the sterile flies will move and be effective in reducing fertility of native flies.

2. To determine how effective sterile flies are in the near vicinity of traps and test animals.

<u>Procedures:</u>

<u>Objective I</u>.

A. All four items under Objective I-A will be pursued through

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A. All four items under Objective I-A will be pursued through

establishment of two trap and bait-animal lines in Sonora.

Three general types of terrain will be sampled (see fig. 1). The one west of Hermosillo represents the desert plains type near sea level where hills and mountains are infrequent and rainfall is generally less than 5 inches a year. The second type just southeast of Hermosillo is in the middle elevation, mixed altos and bahias type, where annual rainfall is between 5 and 10 inches per year. The third is in the mountain foothills at elevations above 3000 ft and rainfall about 15 inches per year.

In each type, a trap and a wounded animal will be maintained down in one of the good bahias, another trap-animal pen will be maintained in a nearby high elevation -- at least 900 feet above the set in the bahia.

Ranchers at each of the locations have been contacted and promise full cooperation as outlined in a justification section. Dr. Mungia Mercado will run this line at least twice a week, if we can furnish his gasoline and meals.

A similar line with 3 sets of 2 sites each will be established on a line through Navojoa, as indicated in fig. 1. The ranchers promise the same cooperation here as along the Hermosillo line. This line is well below any previous drops of sterile flies, while that at Hermosillo lies in an area previously treated in a sporadic fashion. If only the Primary Objectives of this plan are to be pursued, then it is my emphatic request that neither area, within a distance of at least 40 miles from any trap site, be treated any longer with sterile flies until after the

establishment of two trap and bait-animal lines in Sonora.

Three general types of terrain will be sampled (see fig. 1). The one west of Hermosillo represents the desert plains type near sea level where hills and mountains are infrequent and rainfall is generally less than 5 inches a year. The second type just southeast of Hermosillo is in the middle elevation, mixed mites and bahias type, where annual rainfall is between 5 and 10 inches per year. The third is in the mountain foothills at elevations above 3000 ft and rainfall about 15 inches per year.

In each type, a trap and a wounded animal will be maintained down in one of the good bahias, another trap-animal pen will be maintained in a nearby high elevation -- at least 500 feet above the set in the bahia.

Ranchers at each of the locations have been contacted and promise full cooperation as outlined in a justification section. Dr. Manuia Meraado will run this line at least twice a week, if we can furnish his gasoline and meals.

A similar line with 3 sets of 2 sites each will be established on a line through Navojoa, as indicated in fig. 1. The rancheros promise the same cooperation here as along the Hermosillo line. This line is well below any previous drops of sterile flies, while that at Hermosillo lies in an area previously treated in a sporadic fashion. If only the Primary Objectives of this plan are to be pursued, then it is my emphatic request that neither area, within a distance of at least 40 miles from any trap site, be treated any longer with sterile flies until after the

experiment is concluded. It is my desire to run the experiment for at least 3 months in spring, or until the summer low of flies is evident; then another 4 months (August, September, October, and November) until the fall peak of flies is past.

The field cost of this experiment will run about $150 per month for the Hermosillo line, using Dr. Mungia Mercado as the technician, and allowing 15 mi/gal on his vehicle and $5 per day afield for his food. For the Najojoa line the cost will be about $100 per month for vehicle and meals for the technician. The salary of this technician, if he can be hired for 2 or 3 days per week, will be in the neighborhood of $125 per month. Thus, the cost of the spring run for both lines will total about $1025, the fall run about $1500. This estimate does not include the cost of the principal investigator, whose costs afield have been running about $450 per month. However, in addition to supervising the above research, he plans to be pursuing the survey of screw-worm conditions down the coast of Sinaloa and Nayarit.

B. The elements of this objective will be pursued by the principal investigator, with whatever cooperation from the staff of the screw-worm inspectors as may become available. Senor Javies Sanchez Gavito, Information Officer on Dr. Sharman's staff, has expressed a desire to visit the ranchers in Sinoloa and Nayarit to look into their interest in the screw-worm program. and has offered to make his trip coincide with my first one. Dr. Sharman has, under advisement, my request for loan of one of his inspectors to go with me on the first trip through the area. Dr. Sharman has expressed willingness to handle the extra screw-worm samples that will come in from the survey area.

experiment is concluded. It is my desire to run the experiment for at least 3 months in spring, or until the number low of flies is evident; then another 4 months (August, September, October, and November) until the fall peak of flies is past.

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B. The elements of this objective will be pursued by the principal investigator, with whatever cooperation from the staff of the screw-worm inspectors as may become available. Senor Javier Sanchez Davila, Information Officer on Dr. Shannon's staff, has expressed a desire to visit the ranchers in Sinaloa and Nayarit to look into their interest in the screw-worm program. and has offered to make his trip coincide with my first one. Dr. Shannon has, under advisement, my request for loan of one of his inspectors to go with me on the first trip through the area. Dr. Shannon has expressed willingness to handle the extra screw-worm samples that will come in from the survey area.

C. This objective will be pursued through statistical analysis of all available field data, employing primarily the method of mapping isohyetes of screw-worm cases.

Objective II

A. If approved, this objective will require, at minimum, the systematic dispersal of sterile flies near the 2 lines of trap-animal sites. Under minimal investment plans, the systematic drops could be made on 8 mile swaths over the area occupied by each line of test sites, starting on lines 4 miles north and south of a line through the test sites so that effects at the test sites would be those accomplished by sterile flies having had to move the maximum distance to reach the tests. If this were the only use made of sterile flies, then it would be very important that ranches both under the drop area and well out to either side be urged to keep close check on their stock and submit samples of larvae from all known cases. These data could then provide the base line for comparing our data with conditions over the general area.

Under optimal experimental conditions, but at added cost, two lines of test sites should be set near Hermosilla instead of only one, and two should be set up also in the Navojoa area. Then, with adequate separation (40 miles) between pairs of lines, one line (upwind) could be covered with sterile flies, the other would be the check.

experiment is concluded. It is my desire to run the experiment for at least 3 months in spring, or until the summer low of flies is evident; then another 4 months (August, September, October, and November) until the fall peak of flies is past.

The field cost of this experiment will run about $150 per month for the Hermosillo line, using Dr. Bungia Mercado as the technician, and allowing 15 mi/gal on his vehicle and $5 per day afield for his food. For the Navojoa line the cost will be about $100 per month for vehicle and meals for the technician. The salary of this technician, if he can be hired for 2 or 3 days per week, will be in the neighborhood of $125 per month. Thus, the cost of the spring run for both lines will total about $1025, the fall run about $1500. This estimate does not include the cost of the principal investigator, whose costs afield have been running about $450 per month. However, in addition to supervising the above research, he plans to be pursuing the survey of screw-worm conditions down the coast of Sinaloa and Nayarit.

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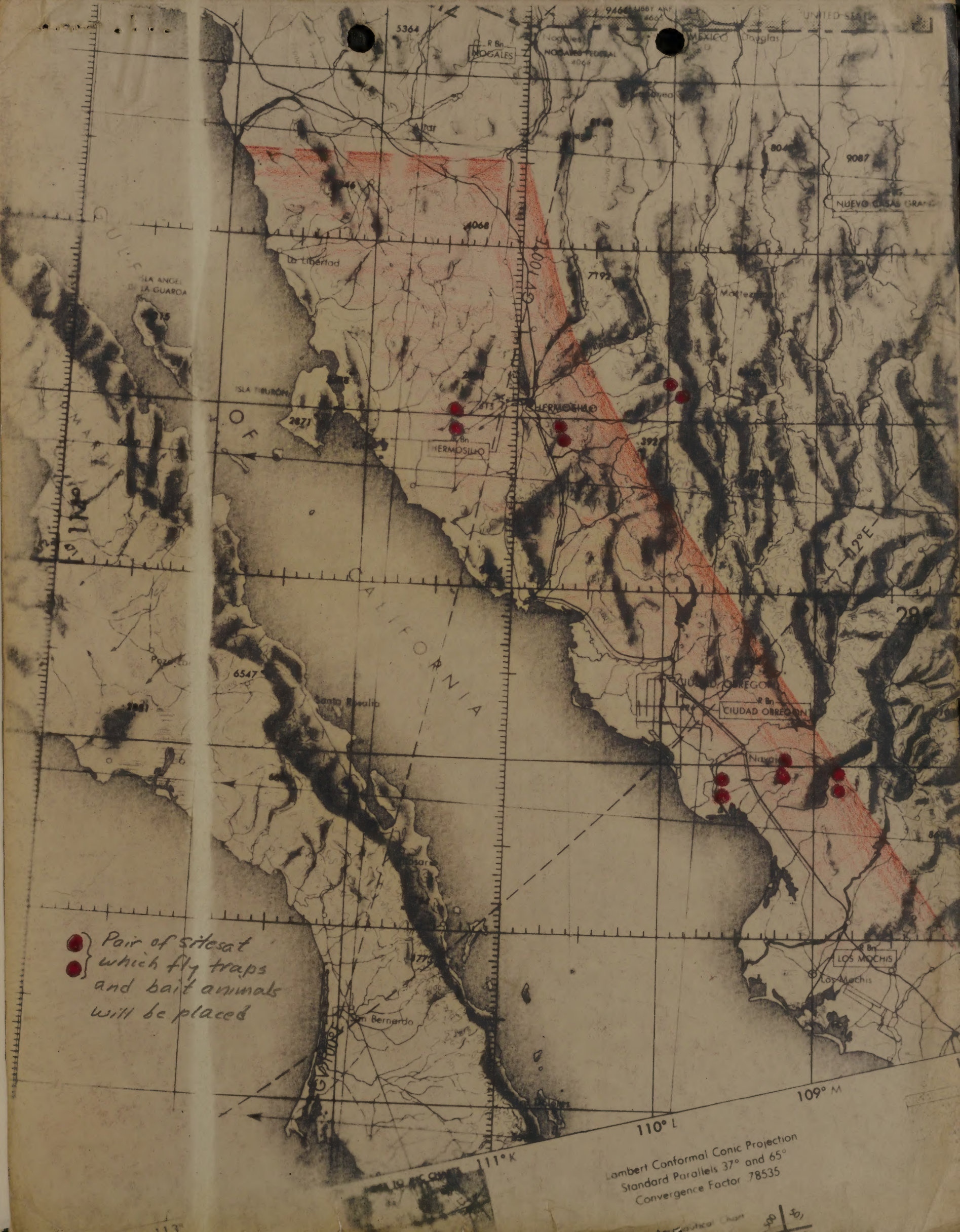
MOGALES
NOGALES FEDERAL
MEXICO
UNITED STATES
NUEVO CASAS GRANDES
La Libertad
ISLA ANGEL DE LA GUARDA
ISLA TIBURÓN
HERMOSILLO
CIUDAD OBREGON
Navojoa
LOS MOCHIS
Los Mochis
Santa Rosalia
San Bernardo
GULF OF CALIFORNIA
Pair of sites at which fly traps and bait animals will be placed
109° M
110° L
111° K
Lambert Conformal Conic Projection
Standard Parallels 37° and 65°
Convergence Factor 78535

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box 986
Mission, Texas 78572

February 2, 1966

To: O. H. Graham
Investigations Leader
Kerrville, Texas

From: B. G. Hightower
Entomologist in Charge

Subject: Field work in Mexico

We have received a copy of Mr. McDuffie's memorandum on travel ceilings and screw-worm research is referred to as a specific example. Perhaps now is the time to present several alternatives as to the means of executing previously proposed projects.

Dr. Davis is terminating the Poza Rica field test and proposes to conduct some life cycle studies on screw-worm flies under tropical conditions near Tihuatlan, Veracruz. He has requested that Mr. Pratt be retained to assist in these large-cage tests.

Dr. Fletcher is currently surveying the area between Tuxpan and Cotaxla, Veracruz for suitable locations in which to conduct preliminary attractants tests. He is also operating fly traps in the vicinity of Poza Rica.

Dr. Crystal is waiting for clearance from Cotton Insects Branch to conduct preliminary tests in the large cage at Iguala. He would like to determine how released populations of flies behave in the cage prior to initating tests to determine the effects of selected chemosterilants on mating behavior and fertility.

The advantages of each professional conducting field work in the area best suited for his research are obvious, but unfortunately this requires maximum travel funds.

A less expensive alternative would be the assignment of all field work to Dr. Davis with maximum coordination between laboratory and field phases. This would necessitate the selection of one area for all field studies and the establishment of some or all of our own facilities. One disadvantage of this plan would be a loss of flexibility in the types of field studies which could be conducted. It would also limit Dr. Davis in his own research as well as cooperative research with ANH.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box 588 985
[redacted]
Mission, Texas 78572

February 2, 1960

To: O. H. Graham
Investigations Leader
Kerrville, Texas

From: H. G. Hightower
Entomologist in Charge

Subject: Field work in Mexico

We have received a copy of Mr. McDuffie's memorandum on travel ceilings and screw-worm research in relation to an a specific example. Perhaps now is the time to present several alternatives as to the means of executing previously proposed projects.

Dr. Davis is terminating the Pozo Rica field test and proposes to conduct some life cycle studies on screw-worm flies under tropical conditions near Tuxtlan, Veracruz. He has requested that Mr. Fisher be retained to assist in these large-cage tests.

Dr. Fletcher is currently surveying the area between Tuxpan and Cotaxla, Veracruz for suitable locations in which to conduct preliminary attractant tests. He is also operating fly traps in the vicinity of Pozo Rica.

Dr. Crystal is waiting for clearance from Cotton Insects Branch to conduct preliminary tests in the large cage at Iguala. He would like to determine how released populations of flies behave in the cage prior to initiating tests to determine the effects of selected chemosterilants on mating behavior and fertility.

The advantages of such professional conducting field work in the area best suited for his research are obvious, but unfortunately this requires maximum travel funds.

A less expensive alternative would be the assignment of all field work to Dr. Davis with maximum coordination between laboratory and field phases. This would necessitate the selection of one area for all field studies and the establishment of some or all of our own facilities. One disadvantage of this plan would be a loss of flexibility in the types of field studies which could be conducted. It would also limit Dr. Davis in his own research as well as cooperative research with AMS.

Another alternative would be the establishment of a screw-worm research laboratory in Mexico. The technical advantages of this plan have already been outlined. It is admittedly based more on the long-term premise that this laboratory will continue to support the present eradication program in any of its future phases either in this country or in Mexico.

Mr. McDuffie
Screw-worm

Kerrville, Texas

Use of large cage at Iguala, Guerrero

T. B. Davich, Investigations Leader
Boll Weevil Investigations
Cotton Insects Research Branch
State College, Mississippi

February 8, 1966

Dr. Hightower and his associates at the screw-worm laboratory in Mission continue to be interested in the possibility of using your large cage at Iguala for chemosterilant and attractant studies on the screw-worm. As a first step, Dr. M. M. Crystal will probably want to study the behavior of irradiated but otherwise untreated screw-worm flies in the cage.

In order that we can begin to make some plans for these tests, it would be appreciated if you could give us an approximate date that screw-worm flies could be released in the cage and observed.

O H Graham

O. H. Graham
Investigations Leader
Livestock Insects Investigations

cc:
W. C. McDuffie
B. G. Hightower

Use of large cage at Iguala, Guerrero

T. H. Parks, Investigations Leader
Boll Weevil Investigations
Cotton Insects Research Branch
State College, Mississippi

February 6, 1956

Dr. Hightower and his associates at the screw-worm laboratory in Mission continue to be interested in the possibility of using your large cage at Iguala for characteristics and attractant studies on the screw-worm. As a first step, Dr. M. Graham will probably want to study the behavior of irradiated but otherwise untreated screw-worm flies in the cage.

In order that we can begin to make some plans for these tests, it would be appreciated if you could give us an approximate date that screw-worm flies could be released in the cage and observed.

O. H. Graham
Investigations Leader
Livestock Insects Investigations

cc:
E. C. Knipling
E. G. Hightower

U.S. DEPARTMENT OF AGRICULTURE

REFERENCE SLIP

DATE: Feb 11

TO

Mr McDuffie

Dr. Weidhaas

- [ ] ACTION
- [ ] NOTE AND RETURN
- [ ] APPROVAL
- [ ] PER PHONE CALL
- [ ] AS REQUESTED
- [ ] RECOMMENDATION
- [ ] FOR COMMENT
- [ ] REPLY FOR SIGNATURE OF
- [ ] FOR INFORMATION
- [ ] RETURNED
- [ ] INITIALS
- [ ] SEE ME
- [ ] NOTE AND FILE
- [ ] YOUR SIGNATURE

REMARKS For your info

Insects Affecting Man & Animals

FEB 14 1966

~~W.C.M.~~

~~D.W.W.~~

~~J.A.F.~~

FROM

Screw-worm

SECRETARIA DE AGRICULTURA Y GANADERIA
INSTITUTO NACIONAL DE INVESTIGACIONES AGRICOLAS
LONDRES NO. 40
MEXICO 6, D.F.
TELS. 11-00-00
11-00-78
11-00-81

Feb. 9, 1966.

Dr. O.H. Graham
Post Office Box No. 232
Kerville, Texas 78029
U.S.A.

Dear Dr. Graham:

I thank you very much for the outline of the work that will be conducted, concerning the activity of screw-worm - attractant lures. I hope that the changes made by Dr. Sánchez have not complicated the approval of the grant, to conduct these tests.

It will not be possible for me to attend the South western Branch Meeting at El Paso. The 14 of February Dr. T.B. Davish will be here in Mexico City to iniciated the boll weevil work at the Iguala Station.

- With best regards,

Sincerely,

A. Ortega

A. Ortega

AOC/ogp

Grain-Sorghum

SECRETARIA DE AGRICULTURA Y GANADERIA

INSTITUTO NACIONAL DE INVESTIGACIONES AGRICOLAS

Dr. O.H. Graham
Post Office Box No. 232
Harvill, Texas 78028
U.S.A.

Dear Dr. Graham:

I thank you very much for the outline of the work that will be conducted, concerning the activity of screw-worm attractant lures. I hope that the changes made by Dr. Spencer in the last communication the approval of the grant, to conduct these tests.

It will not be possible for me to attend the South Western Branch Meeting at El Paso. The 14 of February Dr. T.S. Davish will be here in Mexico City to initiate the boll weevil work at the Iguala Station.

With best regards,

Sincerely,

A. Ortega

AOC/ofp

Screw-worm

February 11, 1966

To : O. H. Graham, Investigations Leader, Livestock Insects Investigations, Entomology Research Division, Kerrville, Texas 78028

From : T. B. Davich, Director

Subject: Use of large cage at Iguala, Guerrero

I would suggest you make plans to run the screw-worm fly studies towards the end of April or early in May. Current plans call for our initiating the boll weevil experiment the week of February 14. We intend to apply an apholate-bait mixture to the plants in three-fourths of the cubicles on a weekly basis. I doubt that you would want the flies released in these cubicles. By the end of April, or perhaps shortly before, we intend removing all of the plants and the cage then will remain free of cotton until sometime in October.

Since the cage is on land leased by the National Cotton Council, I would suggest you obtain correspondence from the appropriate Mexican officials indicating to the Council that such experiments have their permission. You should send such letters or other documents to Dr. Claude L. Welch, Director, National Cotton Council, Box 12285, Memphis, Tennessee 38112.

cc:
S. E. Jones
C. L. Welch
W. C. McDuffie
B. G. Hightower

February 16, 1966

To : R. E. Gordon, Investigations Leader, Livestock Insects Investigations, Entomology Research Division, Kerrville, Texas 78028

From : T. A. Dretch, Director

Subject: Use of large cage on Spanish, Texas

I would suggest you make plans to run the screw-worm fly studies towards the end of April or early in May. Current plans call for our initiating the full weekly experiments the week of February 14. We intend to supply an cobalt-60 mixture to the plants in three-months of the cultivation on a weekly basis. I doubt that you would want the flies released in these conditions. By the end of April, we perhaps should be having all of the plants and the cage then will remain free of cotton until sometime in October.

Since the cage is on land leased by the National Cotton Council, I would suggest you obtain correspondence from the appropriate Texas officials indicating to the Council that such experiments have their permission. You should send such letters or other documents to Mr. Glenn L. Dalton, Director, National Cotton Council, Box 12285, Memphis, Tennessee 38112.

cc:
E. S. Jones
C. L. Dell
K. C. McMillin
E. G. Hightower

Screw worm

February 11, 1966

To: O. H. Graham, Kerrville

From: W. C. McDuffie, Chief, Insects Affecting Man and Animals Research Branch

Subject: Screw-worm fly quality and screw-worm field tests in Mexico in 1966

Reference is made to your two letters of January 20 on the above subjects. These were referred to Dr. Knipling for his comments. A copy of his comments are attached and one is also being sent to Dr. Hightower.

Dr. Knipling's letter clearly indicates his concern over the quality of flies being released. However, I have also discussed this matter with him and can assure you that his letter does not really reflect his much deeper concern in this matter. He would like to know just what your feeling on the matter is and what if anything is being done at the program level to improve fly quality. I told him I did not know for sure what the program people were doing but I believed they were rearing about half of the flies on liquid media and half on meat. It is obvious from the 3rd paragraph of his letter that he favors all meat rearing until such time as the efficiency of the liquid media-reared flies have been shown to be equal to that of meat reared flies.

This is a rather delicate matter to discuss with the program people but you may think it wise to do so. In any event we would like information on the current situation and what might be projected for the future.

We really do not feel competent to comment on the occurrence of mutants in the field larval samples. However, we feel as you do that the matter needs to be investigated along the lines you mentioned. In this connection, I would like to know just what procedures are now followed in the quality control section. At one time I believe this activity was dropped or virtually so and then resumed. I have no information at all on current procedures, but I feel strongly that quality control is highly important and should be a continuing activity.

W. C. McDuffie

Enclosure
cc: (w/cy encl)
R.C.Bushland
B.G.Hightower

WCMCDuffie/mei

[illegible]

To: [illegible] Farrville

From: [illegible], Chief, Inspection Division [illegible]
Research Branch

Subject: Screw-worm fly quality and screw-worm fly [illegible]
Month in 1958

Reference is made to your [illegible] January [illegible] the screw-worm subjects. These were referred to Mr. [illegible] for his [illegible]. Many of his comments are attached and we is also [illegible] to [illegible].

Mr. Phillips's letter clearly indicates his concern over the quality of flies being released. However, I have also discussed this matter with Mr. [illegible] and can assure you that his letter does not [illegible] his much larger concern in this matter. We would like to know just what your feeling on the matter is and if anything is [illegible] [illegible] program level to improve fly quality. I will be [illegible] for more [illegible] people were doing but I believe they were [illegible] about not at the time in Tuscaloosa and [illegible] so [illegible]. It is obvious from the [illegible] of his letter that his [illegible] meeting could [illegible] time in the [illegible] of the Tuscaloosa screw-worm flies have been shown to be equal to that of [illegible] flies.

This is a rather delicate matter to discuss with the [illegible] as you may think it wise to do so. In any event, a [illegible] information on the current situation and what might be projected for the future.

I really do not feel competent to comment on the [illegible] of matters in the field larval [illegible]. However, as far as you do that the matter needs to be investigated along [illegible] to establish in this connection, I would like to know [illegible] are followed in the quality control [illegible]. Among other [illegible] activity was done at [illegible] and this [illegible]. I have no information at all on current procedures, but I feel strongly that quality control is extremely important and should be a continuing activity.

[illegible]

cc: [illegible]
[illegible]
[illegible]
[illegible]

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
BELTSVILLE, MARYLAND 20705

February 9, 1966

To: W. C. McDuffie, Branch Chief, Insects Affecting Man and Animals Research Branch

From: E. F. Knipling, Director, Entomology Research Division

Subject: Rearing screw-worms for release

Dr Graham's memo of January 20 to you on the subject of screw-worm field tests in Mexico in 1966, contained one statement that is disturbing to me. The statement indicates that the liquid-media reared flies are regarded as being equal to the horsemeat-reared flies and that it would be feasible to go back to a 100% liquid-medium operation.

As expected before the field test in Mexico was conducted, it was extremely difficult to prove differences in performance of released flies because of the many variable factors encountered in such operations. However, from the data I saw several months ago I certainly would not conclude that the tests showed the liquid reared flies to be equal in efficiency to the horsemeat flies. Unless there is additional information that I have not seen to show that the liquid flies are equal in performance to horsemeat-reared flies, I would definitely oppose the use of liquid-media reared flies of the type that have been reared in the past.

I am fearful that the attitude might prevail that liquid-media reared flies should be used unless it can be shown that horsemeat-reared flies are better. This is not my view. I feel strongly that horsemeat-reared flies should be reared until it can be shown that liquid-media reared flies are equal to the horsemeat-reared flies. In other words, I think the burden of proof should be on the liquid-media reared flies before they are adopted as the standard fly for release.

Obviously, we are all interested in producing flies as economically as possible. However, I think the quality of the fly released is the most important consideration. We have several years background experience with the horsemeat-reared insects. The population was brought under control with flies reared in this manner. The laboratory observations, the apparent slow response to control of isolated populations last year, and the trend to less efficiency in the Poza Rica test, plus the basic judgment that stunted animals of any kind are inferior all point to one conclusion on my part. The conclusion that it would be a great mistake to release only liquid-media reared flies unless it is shown that these flies are equal or superior to those of the type reared before.

If there is recent information that justifies a change in the opinion I expressed last year, I would very much like to have a report on it.

E.G. Kemp

U.S. DEPARTMENT OF AGRICULTURE

REFERENCE SLIP

DATE 1/26/66

TO Dr. Knightsay

Esle

- [ ] ACTION
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- [ ] REPLY FOR SIGNATURE OF
- [ ] FOR INFORMATION
- [ ] RETURNED
- [ ] INITIALS
- [ ] SEE ME
- [ ] NOTE AND FILE
- [ ] YOUR SIGNATURE

REMARKS Attached are two letters concerning donations of interest to US & to you. Would appreciate any comments you care to make.

W.C.Ay

JAN 26 1966

FROM

EPK
CHT
PWO
JFC
LBR
RRR

GPO : 1964 OF—742-059

FORM AD-514 (8-64)

AS FORM 114 (12-61)
UNITED STATES GOVERNMENT

Memorandum

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Entomology Research Division
Kerrville, Texas

SUBJECT: Screw-worm field tests in Mexico in 1966

Insects Affecting Man & Animals
JAN 24 1966
W.C.M.
D.E.W.
J.A.F.

TO: W. C. McDuffie, Chief
Insects Affecting Man and Animals Research Branch
Beltsville, Maryland

DATE: January 20, 1966

Enclosed for your information is a copy of a memorandum from Dr. Hightower dated December 20, 1965. This memo was written soon after the Quarterly Technical Conference in Mission on December 15 and refers to the fact that we were unable to obtain specific guidance from the conference participants concerning future requirements for field tests.

There was considerable discussion of the Poza Rica test, and we heard quite a bit of comment from AnH Division concerning the costs to them of field tests and the very limited funds which they have available for FY 66. On the other hand, they were quite eager to obtain our concurrence with the idea that the flies currently being produced on liquid media are equal to the horsemeat-reared flies and that it would be feasible to go back to a 100% liquid-medium rearing operation. It was obvious, of course, that answers to questions like this can be obtained only in field tests.

If another field test is to be conducted in 1966, we in ERD would like to consider the use of a new locality. The weather is frequently unfavorable in the Poza Rica area, rancher cooperation has been disappointing, and screw-worm populations generally are rather low. While we are not certain, limited information obtained by Dr. Sharman's group indicates that there is a region farther south in the state of Veracruz (in the vicinity of Cotaxtla, about 40 miles southwest of the port of Veracruz) which would be much more suitable for a field test. The question then arises whether or not AnH Division could support a field test in that area with regular fly release. They had some problems in releasing flies on a fixed schedule at Poza Rica and were not able to make any fly release for almost a month in November. These problems would probably be intensified if the distance from Mission were increased.

It is my feeling that other field tests will almost certainly be required, but that we should make certain that any future tests have the unqualified support of AnH Division and that our fly releases will have sufficient priority within their organization to insure release at the scheduled intervals.

You will note in Dr. Hightower's memorandum that he feels that, from a strictly technical viewpoint, it will be necessary to establish a screw-worm research laboratory in Mexico, and presumably south of any sterile fly release, if we are to continue screw-worm research over a prolonged period of time. I am not so certain that this laboratory is an absolute requirement, but I fully sympathize with him concerning the problems which arise when one attempts to carry out research at such long distances from home base.

In an attempt to obtain a more definite statement of ANH Division's views on the requirements for future field tests, I have written Dr. Gartman a memorandum with a copy to you. Drs. Gartman, Fitcher, and Hightower plan to meet Dr. Sharman in Sinaloa next week, and presumably will have definite recommendations to make concerning tests in that region after their meeting.

O. H. Graham
Investigations Leader
Livestock Insects Investigations

Enclosure

cc:
H. C. Hightower

DEC 21 1965

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box 232 986
~~KERRVILLE, TEXAS~~
Mission, Texas 78572

December 20, 1965

To: O. H. Graham
Investigations Leader
Kerrville, Texas

From: B. G. Hightower
Entomologist in Charge

Subject: Proposed changes in the screw-worm research program

I do not know whether you also felt a deep sense of frustration after the Joint Technical Conference last week, but it appeared to me that we merely up-dated last year's problems. We repeated the Poza Rica field test at considerable expense, but gained little additional research information. Under the present circumstances, the future of the Sinaloa test doesn't look promising. Additional research on attractants and chemosterilants will be hampered by the requirement that any field work be conducted outside the present zone of control operations.

I request that we prepare a proposal defining our present problems and outline the more obvious requirements for solutions. If we are going to provide continuing research support to the screw-worm eradication program, we must work in Mexico. Many of our present difficulties are the result of attempting to conduct laboratory work on one side of the barrier zone and field work on the other.

I fully realize the political and administrative problems involved in proposing the establishment of a laboratory in Mexico, but the continuation of our present program may become technically untenable.

There are still many phases of research on screw-worms that can be successfully conducted at Mission, but ANH should be informed if there is to be a change of objectives before it becomes obvious to them at future conferences.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box 232
BROWNSVILLE, TEXAS
Mission, Texas 78572

December 20, 1962

O. H. Graham
Investigations Leader
Kerrville, Texas

From: E. G. Wightman
Entomologist in Charge

Subject: Proposed changes in the screw-worm research program

I do not know whether you also felt a deep sense of frustration after the Joint Technical Conference last week, but it appeared to me that we merely up-dated last year's problems. We repeated the Pica Rica field test at considerable expense, but gained little additional research information. Under the present circumstances, the future of the Sinaloa test doesn't look promising. Additional research on attractants and chemosterilants will be hampered by the requirement that any field work be conducted outside the present zone of control operations.

I request that we prepare a proposal defining our present problems and outline the more obvious requirements for solutions. If we are going to provide continuing research support to the screw-worm eradication program, we must work in Mexico. Many of our present difficulties are the result of attempting to conduct laboratory work on one side of the barrier zone and field work on the other.

I fully realize the political and administrative problems involved in proposing the establishment of a laboratory in Mexico, but the continuation of our present program may become technically untenable.

There are still many phases of research on screw-worm that can be successfully conducted at Mission, but ARS should be informed if there is to be a change of objectives before it becomes obvious in the at future conferences.

Mr. McDuffie

Kerrville, Texas

Screw-worm field tests in Mexico

Insects Affecting
Man & Animals

JAN 24 1966

W.C.M.
D.E.W.
J.A.F.

S. C. Gartman
Assistant Veterinarian in Charge
Screw-Worm Eradication Activities
Animal Health Division
Mission, Texas

January 20, 1966

As you know, we are in the process of closing out the Poza Rica test, and we must make a decision concerning the disposition of the Government-owned animals which were used in the test. Because of the difficulties we have encountered in the past in the procurement of suitable sheep in Mexico, I would like to hold the sheep we now have if we are reasonably certain that another field test will be conducted this year.

At the last Technical Conference, we discussed in considerable detail the problems involved in conducting these field tests, but I am not certain of AnH Division's desires concerning another test. We would feel quite relieved, of course, if you would tell us that additional field tests are not needed, but I think it was generally understood that we have no reliable means of judging fly quality other than to set up field tests which will evaluate the competitiveness of sterile males with wild males.

You are probably also aware from conversation with Dr. Hightower that we have not been happy with the Poza Rica area as a test site. The weather has been unfavorable for screw-worm activity for surprisingly long periods of time, rancher cooperation has not been as good as we had hoped for, and populations of wild flies seem to be rather low. Preliminary information from Dr. Sharman's survey of the Cotaxtla region of southern Veracruz indicates that this region might be much more suitable. If a more detailed investigation indicates that Cotaxtla would be a better site, would AnH Division be able to support a test in that area with weekly fly releases? We realize the problems involved in making regularly scheduled releases at such a great distance from Mission, but I think that you can see how important it is from our viewpoint that releases actually be made as planned.

We would appreciate any guidance you can give us concerning future field tests, and would especially like to know whether or not you feel we should sell the sheep now at Tuxpan or hold them for future use.

O H Graham

O. H. Graham
Investigations Leader
Livestock Insects Investigations

cc:
W. C. McDuffie
B. G. Hightower

Harlingen, Texas

Screw-worm field tests in Mexico

January 20, 1956

E. C. Cushing
Assistant Veterinarian in Charge
Screw-Worm Eradication Activities
Animal Health Division
Mission, Texas

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O. H. Graham
Investigations Leader
Livestock Insects Investigations

cc:
G. C. Medellin
H. C. Hightower

AS FORM 114 (12-61)
UNITED STATES GOVERNMENT

Memorandum

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Entomology Research Division
Kerrville, Texas

SUBJECT: Screw-worm fly quality

TO: W. C. McDuffie, Chief
Insects Affecting Man and Animals Research Branch
Beltsville, Maryland

DATE: January 20, 1966

Last week's report on the Poza Rica test made brief reference to fly quality. This reminded me that we had in the past discussed the larval marker with which a high percentage of the Florida strain screw-worms seem to be marked and the occurrence of similarly marked larvae in screw-worm samples submitted by Texas ranchers earlier this year. Dr. Fletcher prepared a summary of his observations last July, and I am forwarding a copy for your information. It is my understanding that Dr. Fletcher has not seen the larvae received by ANH Division since July, but it would be very interesting to know whether or not larvae from the recent Hidalgo Co. cases are of the mutant type.

As mentioned in our discussions of this subject last summer, we do not feel that this information is conclusive evidence that the field-collected larvae were of the Florida strain, but it is rather strong circumstantial evidence and furnishes justification for increased efforts in the Quality Control section to check sterility and all other aspects of fly quality.

O H Graham

O. H. Graham
Investigations Leader
Livestock Insects Investigations

Enclosure

cc:
R. C. Bushland
B. G. Hightower

Entomology Research Division
Kerrville, Texas

Screw-worm fly quality

W. G. McDuffie, Chief
Insects Affecting Man and
Animals Research Branch
Beltsville, Maryland

January 20, 1956

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O. H. Graham
Investigations Leader
Livestock Insects Investigations

Enclosure

cc:
S. C. Busland
B. G. Hightower

Rough Draft
7/23/65

Report on a Screw-worm Larval Genetic Marker

L. W. Fletcher

Mutant screw-worm larvae with a completed anterior band of spines on the 11th larval segment (designated as "Ca" larvae) were found in the mass-produced wild-type screw-worm fly or the so called "Florida strain" in 1962. Normally this band of spines is interrupted on the dorsum and does not encircle the segment. A survey made at that time disclosed that seven samples of 200 or more larvae each contained 4%-21% Ca mutants. In 1964 thirty-two samples from the Fla strain containing 1,1885 larvae were found to contain 34% Ca mutant larvae. Among the samples, the percentage of mutants ranged from 23%-50%. Further studies (1964) in which 100 larval cultures were reared from single egg masses showed that a high percentage of the Fla strain flies possessed the Ca mutant gene(s). Of this group only two females produced 100% wild-type progeny. The percentage of mutants per culture ranged from 0%-89%. Twenty-six percent of the total larvae (11,554) from all cultures were mutant. In laboratory studies the gene(s) for this character appeared to be dominant with variable penetrance. Selection pressure and a series of pair-mating produced a culture with 100% mutant progeny in the F_{17} generation.

An examination of screw-worm larvae collected in Texas, in 1961 (67 samples, 664 larvae) revealed that all conformed to the original description for wild-type screw-worm larvae. This study was supplemented by a survey of 354 screw-worm samples (4,355 larvae) collected in Arizona, Texas, and Mexico during 1964 and 214 screw-worm samples (1,745 larvae) collected in Arizona, Texas, and New Mexico during the current year (1965). In 1964 only 4 samples containing Ca larvae were collected. All were from Texas. Three of these were collected during a two week period in November; the other reported under unusual circum-

Report on a screw-worm larval insecticide test

E. W. Hathaway

Mature screw-worm larvae with a compacted armorer band of spines on the 11th larval segment(designated as "Ia" larvae)were found in the new mass-produced wild-type screw-worm fly, or the so called "Florida strain" in 1964. Normally this band of spines is intermediate in the armorer and does not encircle the segment. A survey made at that time disclosed that seven samples of 300 or more larvae each contained 4.-12% Ia mutants. In 1964 thirty-two samples from the Fla strain containing 1,1645 larvae were found to contain 3.4% Ia mutant larvae. Among the samples, the percentage of mutants ranged from 0%-30%. Further studies(1964) in which 100 larval uniforms were reared from single egg masses showed that a high percentage of the Ia strain flies possessed the Ia mutant gene(s). In this strain only two females produced live wild-type progeny. The percentage of armorless mutants ranged from 0-6%. Twenty-six percent of the 1 and larvae(1,554) from all 2 flies were mutant. In laboratory studies the gene(s) for this character appeared to be dominant with variable penetrance. Irradiation pressure and a series of mutating produced a culture with 100% mutant progeny in the F_2 generation.

An examination of screw-worm larvae collected in Texas, in 1961 (67 samples, 664 larvae) revealed that 11 conformed to the original description for wild-type screw-worm larvae. This study was supplemented by a survey of 954 screw-worm samples(4,355 larvae) collected in Arizona, Texas, and Mexico during 1964 and 214 screw-worm samples(1,745 larvae) collected in Arizona, Texas, and New Mexico during the current year(1965). In 1964 only 4 samples containing 6a larvae were collected. All were from Texas. Three of these were collected during a two week period in November; the other reported some abnormal armor-

stances. Nineteen screw-worm samples collected in Texas this year have contained Ca larvae. Samples from other states contained only wild-type larvae.

It is difficult to evaluate the value of this mutant as a larval genetic marker. However, a pure mutant culture was eventually established in the laboratory, and recent studies indicate that the percentage of Ca mutants in the screw-worm production strain is increasing. Selection pressure on this strain may increase the frequency of this character to a level at which all female flies will produce significant numbers of mutant progeny. As samples from Mexico have not contained Ca mutant larvae, it appears that this mutation would be of value in determining the origin of field samples of screw-worm larvae. Particularly in areas that previously have been declared to be free of screw-worm flies.

Screw-worm

February 11, 1966

To: O. H. Graham, Kerrville

From: W. C. McDuffie, Chief, Insects Affecting Man and Animals Research Branch

Subject: Report of Poza Rica Test

Reference is made to your letter of January 13 transmitting Dr. Davis' report on the subject test and your analysis of the results.

From my point of view it is very difficult to make any definite conclusion from the results of the test. The first part strongly suggested that the meat reared flies were superior but we need similar results after the shift to really tie this down. Unfortunately, weather conditions and other factors apparently wrecked any chances of confirmation.

I referred the entire record to Dr. Knipling and here are his comments.

"This is enough to convince me that we should raise the best flies possible. Also, we need to consider possible changes in behavior and should not use too wide swaths for releases. There is a big difference between 17% and 6% in a program even though statistically, it may be difficult to show significant differences."

W. C. McD.

cc:
B.G.Hightower
R.C.Bushland

WCMcDuffie/mej

Gow.

February 11, 1949

To: D. H. Graham, Barrville

From: W. C. McDuffie, Chief, Insects Affecting Man and Animals Research Branch

Subject: Report of Fly Bite Test

Reference is made to your letter of January 31 transmitting Dr. Lewis' report on the subject test and your analysis of the results.

From my point of view it is very difficult to make any definite conclusion from the results of the test. The first part strongly suggested that the wool rolled flies were superior but the second similar results after the shift to finally tie this down. Unfortunately weather conditions and other factors apparently produced any chances of confirmation.

I returned the entire record to Dr. Knipling and here are his comments.

"This is enough to convince me that we should raise the most flies possible. Also, we need to determine possible changes in behavior and should not use too wide awards for reactions. There is a big difference between 1% and 50% in a program even though statistically it may be difficult to show significant differences."

cc:
E.C. Hampton
E.F. Knipling

WCMcDuffie/mej

U.S. DEPARTMENT OF AGRICULTURE

REFERENCE SLIP

DATE 1/18/66

TO Dr. R. Miplsky

- [ ] ACTION
- [ ] NOTE AND RETURN
- [ ] APPROVAL
- [ ] PER PHONE CALL
- [ ] AS REQUESTED
- [ ] RECOMMENDATION
- [ ] FOR COMMENT
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- [ ] SEE ME
- [ ] NOTE AND FILE
- [ ] YOUR SIGNATURE

REMARKS For your info and comments.

Cmc

this is enough to convince me that we should raise the best flies possibly

also we need to consider possible changes in bitterness also not to use too wide swathes

JAN 18 1966

ETK
CHH
JFC
LBR
RRR

FROM or ritas

there is a big difference between 1790 + 690 in a project of this kind, even though statistically it may be difficult to show significant differences Ste

GPO : 1964 OF—742-059 FORM AD-514 (8-64)

U.S. DEPARTMENT OF AGRICULTURE

REFERENCE SLIP

DATE

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TO

- [ ] ACTION
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REMARKS

FROM

GPO : 1964 OF—742-059

FORM AD-514 (8-64)

AS FORM 114 (12-61)
UNITED STATES GOVERNMENT

Memorandum

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Entomology Research Division
Kerrville, Texas

SUBJECT: Report on Poza Rica test

TO: W. C. McDuffie, Chief
Insects Affecting Man and
Animals Research Branch
Beltsville, Maryland

DATE: January 13, 1966

Transmitted herewith is a copy of Dr. Davis's report on the Poza Rica test for the period August 13-December 10. I apologize for the delay in getting this report to you; it was sent to me before Christmas, but he and I have discussed the report in considerable detail since then and have made a few minor changes. Dr. Davis has prepared an excellent summary, and I am sure it will be as interesting to you as it was to me. He has done a good job of presenting the factual data obtained from the test and in presenting plausible interpretations of the data.

In my discussions of the report with Drs. Davis and Hightower I have taken the liberty of making a personal interpretation which includes some unsupported speculation. The data actually obtained differ from those anticipated, as is so often true in research, and it is very difficult to draw clean-cut conclusions from the data. In attempting to understand what happened, I have speculated as follows:

1. The percentage of sterile egg masses was low throughout the test (zero to 43%, average 17.3%, where horsemeat-reared flies were released; zero to 16%, average 6.4% where hydroponic-reared flies were released. These figures were obtained from the attached tabulation in which I ignored all collections made before September 19. In addition, I arbitrarily gave the horsemeat-reared flies credit for all sterility occurring in the South Zone until November 12 and in the North Zone after November 12 -- undoubtedly an oversimplification.)

2. The sterilities observed were so low that it seems unlikely that the sterile male release caused an appreciable population decline in either zone. I feel that cool weather had a greater inhibiting effect on total number of egg masses collected than did sterile male release.

3. While the area used for the test (approximately 70 X 120 miles) is not large enough to overcome all effects of fertile fly migration from outside of the release zone, it is unlikely that migrating females deposited a significant portion of the egg masses collected.

Entomology Research Division
Kerrville, Texas

Report on Pora Rica test

W. C. Mohrig, Chief
Insects Affecting Man and
Animals Research Branch
Beltsville, Maryland

January 13, 1948

Transmitted herewith is a copy of Dr. Davis's report on the Pora Rica test for the period August 13-December 10. I apologize for the delay in getting this report to you; it was sent to me before Christmas, but he and I have discussed the report in considerable detail since then and have made a few minor changes. Dr. Davis has prepared an excellent summary, and I am sure it will be as interesting to you as it was to me. He has done a good job of presenting the factual data obtained from the test and in presenting plausible interpretations of the data.

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1. The percentage of sterile egg masses was low throughout the test (zero to 43%, average 17.3%, where horsemeat-reared flies were released; zero to 10%, average 6.4% where hydroponic-reared flies were released. These figures were obtained from the attached tabulation in which I ignored all collections made before September 19. In addition, I arbitrarily gave the horsemeat-reared flies credit for all sterility occurring in the South zone until November 12 and in the North zone after November 12 -- undoubtedly an overamplification.)

2. The sterilities observed were so low that it seems unlikely that the sterile male release caused an appreciable population decline in either zone. I feel that cool weather had a greater inhibiting effect on total number of egg masses collected than did sterile male release.

3. While the area used for the test (approximately 70 x 120 miles) is not large enough to overcome all effects of fertile fly migration from outside of the release zone, it is unlikely that migrating females deposited a significant portion of the egg masses collected.

4. There are virtually no wild animals in this part of Veracruz large enough to support a screw-worm infestation. All livestock is in relatively small pastures and is seen by a herdsman almost every day. Very few cases of screw-worms were reported by ranchers during the period of the test. These things lead me to believe that the population of native flies was rather low throughout the test.

5. On the presumption that proven fly distribution techniques were used throughout the test, the low sterilities observed then suggest that fly quality was inadequate. The theory that the sterile flies were in some way defective is further supported by failure of sterile fly releases to be as effective in Medina and surrounding counties and in Zavala County, Texas, in 1965 as they were in previous years.

6. We have very little concrete information on the nature of the deficiencies, if any, in the plant-reared flies. In general, they were not unusually small for media-reared flies. It has been observed, however, that flies distributed outside the plant tend to be sessile and many of them seem to be reluctant to fly. In other words, it is possible that inadvertent selection for inactivity and conservation of energy has taken place and that the program flies are less effective than the flies routinely produced in previous years.

O H Graham

O. H. Graham
Investigations Leader
Livestock Insects Investigations

Enclosure

Attachment

cc:
R. C. Bushland
B. G. Hightower

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O. H. Graham
Investigations Leader
Livestock Insects Investigations

Enclosure

Attachment

cc:
R. C. Dunkland
B. G. Hightower

Sterility observed in egg masses collected from zero and 6-mile pens (pooled data), Poza Rica test. Horsemeat-reared flies were dropped in South Zone and hydroponic-reared flies in the North Zone, August 13-October 13. Beginning October 22 this plan of fly release was reversed.

Week ending	Percent sterile egg masses from zero- and 6-mile pens	
	South Zone	North Zone
Sept. 25	35	6.4
Oct. 2	43	3.7
9	10	3.4
16	8.7	0
23	19	16
29	17	0
Nov. 5	0	0
12	28	0
19	14	30
26	11	2.7
Dec. 3	0	3.3
10	10.5	25

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Mr. B. Duffie

ENT h2-15 Development of Improved Media and Mass Rearing and Distribution Techniques for Screw-Worm Control

1. Studies in screw-worm ecology.

A. Field test in Poza Rica, Veracruz, Mexico.

(Davis, Pratt, Turner, Lopez)

The first complete drop of sterile flies was made over the test area on August 13, 1965, the next on August 25. Weekly drops were made through October 27 without interruption. The next three drops came on November 26, and December 3 and 10, the gap in drops being due to bad flying weather.

From August 21 to December 10 a series of 18 sheep pens, with wounded sheep in each pen, has been used to collect screw-worm egg masses and determine the ratio of sterile-mated to fertile-mated native female flies in the area. Records of egg mass collections have been kept by date, sheep numbers, and pen number. All egg masses collected have been placed in an 87° F constant-temperature cabinet, approximately 90% RH, for 24-36 hr to observe hatch. Each egg mass was placed next to a small piece of fresh beef before incubation. A low power (10 X 0.7-3.0) stereoscopic microscope was used for determination of species, embryonation, and hatch.

The locations of the sheep pens are shown in Fig. 5. There are 3 pens in each zone that are located on the flight lanes, 3 that are 6 miles from the nearest lane, and 3 pens that are 3 miles away from a flight lane. This report covers only the data from the 12 pens at zero or 6-mile intervals from flight lanes. The data from the 3-mile pens are incomplete due to death of sheep.

The experimental plan called for sterile flies reared on horsemeat to be dropped at the rate of 420 flies/sq mile along the 6 flight lanes of the south zone, and hydroponic-reared sterile flies at the same rate along the lanes of the north zone. This scheme was reversed on October 22 by switching the 2 types of sterile flies from one zone to the other. The change was made when it appeared that the fly-drop might not be continued for many more weeks, and because the fly population in the south zone seemed so much lower than that in the north. If the trend noted in north vs. south zones up until October 22 were reversed following a reversal in fly-drop, it would add weight to the evidence favoring superiority of the horsemeat-reared flies over the hydroponic flies.

Figs. 6 through 8 present the data in graphic form, in order to point up the significant effects of the major experimental variables. The error terms given for averages are from tables for binomial distributions of variability. Fig. 6 displays the differences between the 6 pens at zero-mile and the 6 pens at 6-mile distances from drop lanes, disregarding zones. This

EMT 42-15 Development of Improved Media and Mass Rearing and Distribution Techniques for Screw-Worm Control

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comparison should measure whether or not the 12-mile swath width did, indeed, give even coverage of sterile flies. The results, as illustrated, are not dramatic, in that sterility of egg masses was generally low, while total egg mass collections were highly variable. Failure to obtain egg masses was due largely to onset of cool, windy, wet northers, the first of which passed on October 1, the second on October 23 and 24. Between October 24 and November 19 there was a period of gradually warming, dry weather ended by the third severe norther of the year.

Nevertheless, Fig. 6 illustrates a measurable difference between pen locations in relation to flight lanes. Sterility was higher at the zero-mile pens than at the 6-mile ones. The differences were about the same before and after the switch, although post-switch sterilities trended higher than those for the pre-switch period, in spite of the period of no-drops after the switch. Hypotheses suggested by these data are: (1) The drop rate was too low to cope with the native flies to the extent of showing clear eradication trends; (2) The flies present, either the released or the native, or both, were not moving about as much as they seem to in drier, less heavily vegetated regions. These two ideas are supported by the fact that no appreciable sterility occurred until over 4 weeks after the first drop, which was made on the 13th of August. (3) Fall weather, dropping the temperature for a few days to the mid-sixties (^{o} F), drastically reduces fly activity, although it does not seem to kill them. (4) Fly longevity is great in this environment, as evidenced by the two times when sterility increased suddenly after a lag of about a month. It may exceed the 3-4 weeks achieved under laboratory conditions.

Fig. 7 displays only the zero-mile pen data for each zone. This comparison between zones should measure the relative effectiveness of the two diets used in rearing the sterile flies. Hypotheses suggested by the data are: (1) Wherever the flies reared on horsemeat were released, a greater sterility rate was found. Presuming the extended longevity suggested by the data of Fig. 6, then it could be that the horsemeat-diet flies produced the sterility observed in both zones approximately one month after the switch. (2) In the south zone, pre-switch period, the horsemeat-diet flies may have reduced the native population before the first severe norther. Egg mass collections in the north zone were highest at the same time.

Fig. 8 displays the data only for the 6-mile pens in both zones, and suggests the following: (1) The ability of the sterile flies to move from point of release did not differs according to their larval diet. (2) H
(2) Horsemeat-diet flies were associated with slightly higher trends in sterility than hydroponic-diet flies, but not significantly so.

General conclusions drawn from the study to date are: (1) Too few flies (of the quality used in this test) per unit area are being dropped in this tropical environment. (2) Horsemeat-diet flies are somewhat better than hydroponic-diet flies, but the difference is not well revealed because of the too low sterile fly densities. (3) Dispersal of either sterile or native flies, or both, is less than expected, and is probably inadequate

comparison should measure whether or not the 12-mile mesh which did, indeed, give even coverage of sterile flies. The results, as illustrated, are not dramatic, in that sterility of egg masses was generally low, while total egg mass collections were highly variable. Failure to obtain egg masses was due largely to onset of cool, windy, wet weathers, the first of which passed on October 1, the second on October 23 and 24. Between October 24 and November 13 there was a period of gradually warming, dry weather ended by the third severe norther of the year.

Nevertheless, Fig. 6 illustrates a measurable difference between pen locations in relation to flight lanes. Sterility was higher at the zero-mile pens than at the 6-mile ones. The differences were about the same before and after the switch, although post-switch sterilities treated higher than those for the pre-switch period, in spite of the period of no-drops after the switch. Hypotheses suggested by these data are: (1) The drop rate was too low to cope with the native flies to the extent of showing clear eradication trends; (2) The flies present, either the released or the native, or both, were not moving about as much as they seem to in drier, less heavily vegetated region. These two ideas are supported by the fact that no appreciable sterility occurred until over 4 weeks after the first drop, which was made on the 13th of August. (3) Fall weather, dropping the temperature for a few days to the mid-sixties (°F), drastically reduces fly activity, although it does not seem to kill them. (4) Fly longevity is great in this environment, as evidenced by the two times when sterility increased suddenly after a lag of about a month. It may exceed the 3-4 weeks achieved under laboratory conditions.

Fig. 7 displays only the zero-mile pen data for each zone. This comparison between zones should measure the relative effectiveness of the two dates used in rearing the sterile flies. Hypotheses suggested by the data are: (1) Wherever the flies reared on boreamat were released, a greater sterility rate was found. Presuming the extended longevity suggested by the data of Fig. 6, then it could be that the boreamat-diet flies produced the sterility observed in both zones approximately one month after the switch. (2) In the south zone, pre-switch period, the boreamat-diet flies may have reduced the native population before the first severe norther. Egg mass collections in the north zone were highest at the same time.

Fig. 8 displays the data only for the 6-mile pens in both zones, and suggests the following: (1) The ability of the sterile flies to move from point of release did not differ according to their larval diet. (2) Boreamat-diet flies were associated with slightly higher trends in sterility than hydroponic-diet flies, but not significantly so.

General conclusions drawn from the study to date are: (1) Too few flies (or the quality used in this test) per unit area are being dropped in this tropical environment. (2) Boreamat-diet flies are somewhat better than hydroponic-diet flies, but the difference is not well revealed because of the too low sterile fly densities. (3) Dispersal of either sterile or native flies, or both, is less than expected, and is probably inadequate

for providing equal numbers of sterile males along the flight lanes and at distances of 6 miles from the flight lanes. This characteristic may be associated, in either kind of fly, with the lush vegetation, warm temperatures, and ubiquitous surface water. In the released flies it may also be an inherited response due to many generations of selection for inactivity under colony rearing conditions. (4) Sudden temperature drops associated with high winds and heavy rains do not kill the flies but do inactivate them for extended periods. (5) Longevity of either native or sterile, or both kinds of flies may exceed the usual 3-4 weeks achieved in the laboratory.

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Table . Comparison of ratios of numbers of fertile screw-worm egg masses to all screw-worm egg masses collected at the 12 sheep pens shown in Fig. 5.

Dates		South zone			North zone			Both zones	
Week ending	Sterile screw-worm fly drops	3 pens at 0 miles	3 pens at 6 miles	Total	3 pens at 0 miles	3 pens at 6 miles	Total	6 pens at 0 miles	6 pens at 6 miles
	8/13	(horsemeat-reared flies)			(hydroponic-reared flies)				
8/21		5-5 [a]	1-1	6-6	8-8	5-5	13-13	13-13	6-6
	8/25								
8/28		23-23	20-20	43-43	14-14	14-14	28-28	37-37	34-34
	9/1								
9/4		38-38	35-35	73-73	19-19	16-16	35-35	57-57	51-51
	9/8								
9/11		9-9	4-4	13-13	10-10	31-30	41-40	19-19	35-34
	9/15								
9/18		1-1	6-6	7-7	6-6	24-24	30-30	7-7	30-30
	9/22								
9/25		13-6	7-7	20-13	34-31	28-27	62-58	47-37	35-34
	9/29								
10/2		17-9	4-3	21-12	45-43	36-35	81-78	62-52	40-38
	10/6								
10/9		4-4	6-5	10-9	17-16	42-41	59-57	21-20	48-46
	10/13								
10/16		8-6	15-15	23-21	16-16	23-23	39-39	24-22	38-38
	10/22	Fly drops switched to horsemeat-reared in north zone, hydroponic-reared sterile flies in south zone							
10/23		2-1	14-12	16-13	9-6	22-20	31-26	11-8	36-32
	10/27								
10/29		2-2	10-8	12-10	0-0	14-14	14-14	2-2	24-22
11/5		7-7	14-14	21-21	4-4	1-1	5-5	11-11	15-15
11/12		3-1	15-12	18-13	0-0	5-5	5-5	3-1	20-17

Table . Comparison of ratios of numbers of fertile screw-worm egg masses to all screw-worm egg masses collected at the 12 sheep pens shown in Fig. 5.

Dates		South zone			North zone			Both zones	
Week ending	Fertile screw-worm fly drops	3 pens at 0 miles	3 pens at 6 miles	Total	3 pens at 0 miles	3 pens at 6 miles	Total	6 pens at 0 miles	6 pens at 6 miles
	8/13	(Boreamast-reared flies)			(hydroponic-reared flies)				
8/21		5-5 [a]	1-1	6-6	8-8	5-5	13-13	13-13	6-6
	8/25								
8/28		23-23	20-20	43-43	14-14	14A14	28-28	37-37	34-34
	9/1								
9/4		36-36	35-35	73-73	19-18	16-16	35-35	57-57	51-51
	9/8								
9/11		9-9	4-4	13-13	10-10	31-30	41-40	19-19	33-34
	9/15								
9/18		1-1	6-6	7-7	6-6	24-24	30-30	7-7	30-30
	9/22								
9/25		13-6	7-7	20-13	34-31	28-27	62-58	47-37	35-34
	9/29								
10/2		17-9	4-3	21-12	45-43	36-35	81-78	62-52	40-38
	10/6								
10/9		4-4	6-5	10-9	17-16	42-41	59-57	21-20	48-46
	10/13								
10/16		6-6	15-15	23-21	16-16	23-23	39-39	24-22	38-38
	10/22	Fly drops switched to boreamast-reared in north zone, hydroponic-reared sterile flies in south zone							
10/23		2-1	14-12	16-13	9-6	22-20	31-26	11-8	38-32
	10/27								
10/29		2-2	10-8	12-10	0-0	14-14	14-14	2-2	24-22
11/5		7-7	14-14	21-21	4-4	1-1	5-5	11-11	15-15
11/12		3-1	15-12	18-13	0-0	5-5	5-5	3-1	20-17

Table . Cont'd

Dates		South zone			North zone			Both zones	
Week ending	Sterile screw-worm fly drops	3 pens at 0 miles	3 pens at 6 miles	Total	3 pens at 0 miles	3 pens at 6 miles	Total	6 pens at 0 miles	6 pens at 6 miles
11/19		24-18	25-24	49-42	17-8	23-20	40-28	41-26	48-44
11/26	11/26	11-11	17-14	28-25	12-11	26-26	38-37	23-22	43-40
12/3		3-3	11-11	14-14	10-9	24-24	34-33	13-12	45-44
12/10	12/6 12/6	1-0	18-17	19-17	3-3	9-6	12-9	4-3	30-26

a/ Example: "5-5" means 5 total screw-worm egg masses, listed as first number; followed by 5 fertile screw-worm egg masses, listed as number following the dash mark. These pairs of numbers in each cell of the table are totals for the week ending on the date given in the left column of the table.

Table . Cont'd

Week ending	Sterile screw-worm fly drops	South zone: 3 pens at 0 miles	South zone: 3 pens at 6 miles	South zone: Total	North zone: 3 pens at 0 miles	North zone: 3 pens at 6 miles	North zone: Total	Both zones: 6 pens at 0 miles	Both zones: 6 pens at 6 miles
11\15		24-18	23-24	45-42	17-8	23-20	40-28	41-26	43-44
11\26	11\26	11-11	17-14	28-25	12-11	20-26	38-37	23-22	43-40
12\3		3-3	11-11	14-14	10-9	24-24	34-33	13-12	43-44
12\10	12\6 12\6	1-0	18-17	19-17	3-3	9-6	12-9	4-3	30-26

a/ Example: "3-3" means 3 total screw-worm egg masses, listed as first number; followed by 3 fertile screw-worm egg masses, listed as number following the dash mark. These pairs of numbers in each cell of the table are totals for the week ending on the date given in the left column of the table.

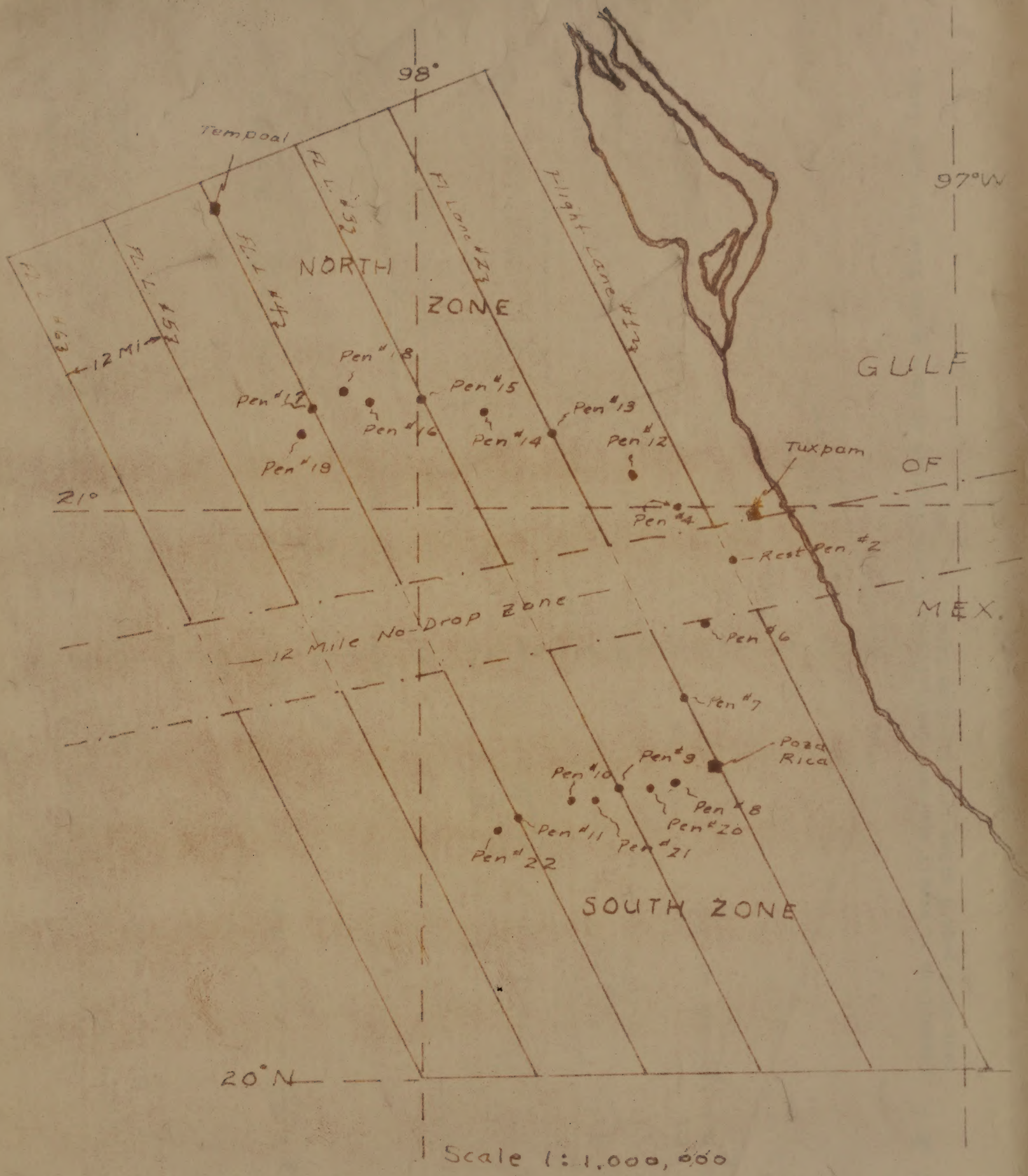

FIGURE 5. MAP OF PEN LOCATIONS, POZA RICA FIELD TEST, VERACRUZ, MEX.

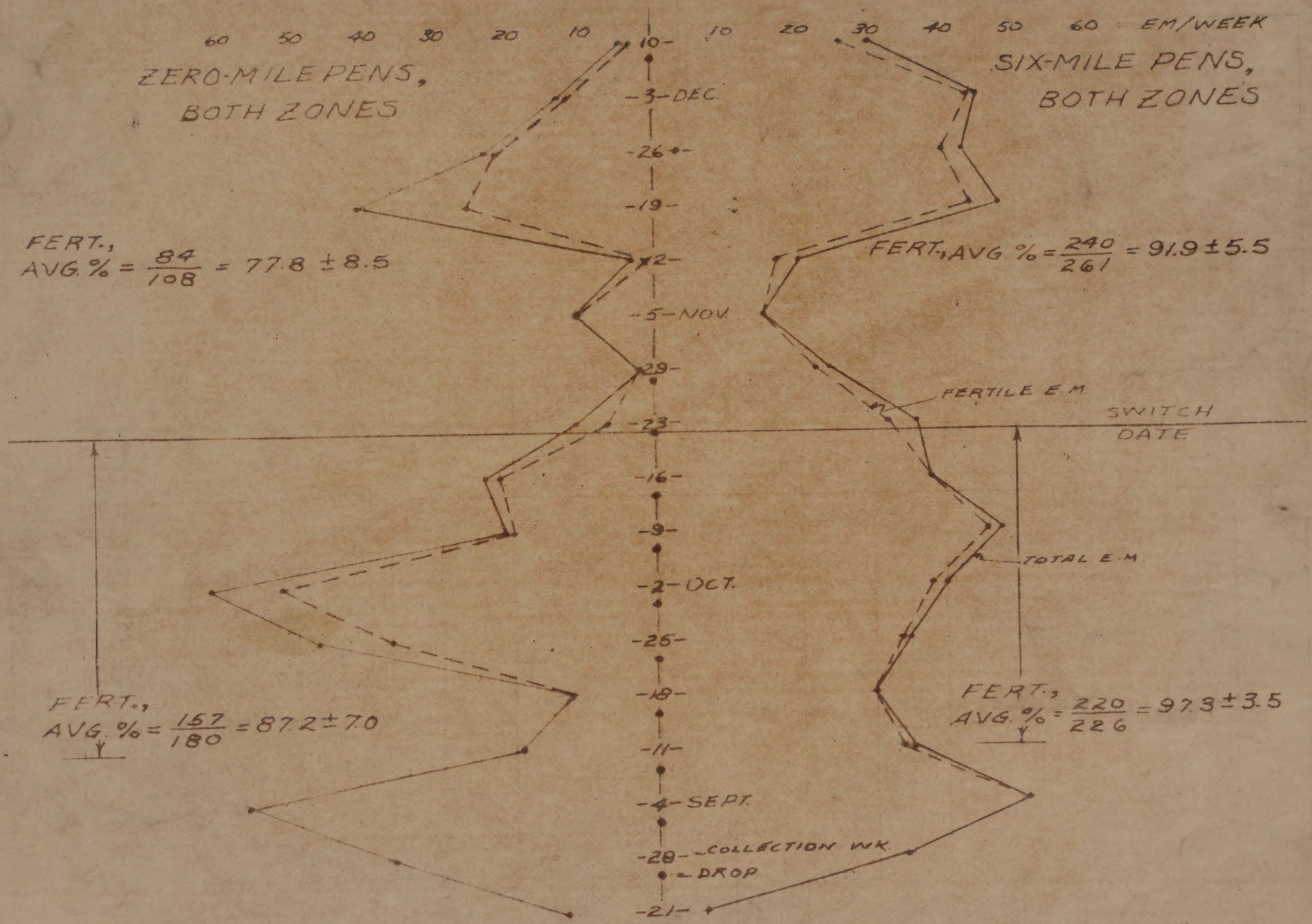

FIG. 6. Comparison of weekly egg-mass fertility at 6 pens located at zero miles from fly-drop lanes with that at 6 pens 6 miles from fly-drop lanes.

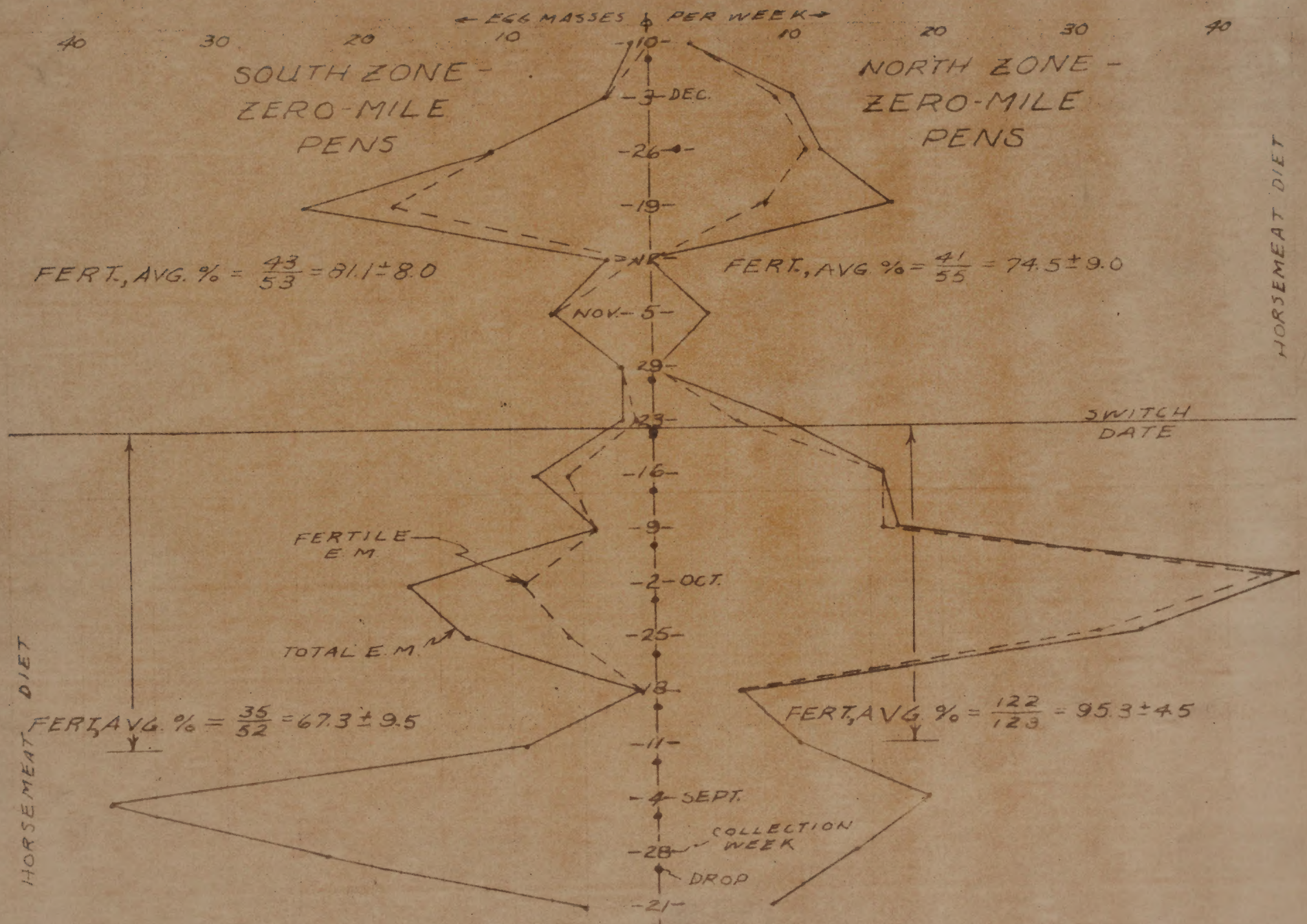

FIG. 37. Comparison of egg masses collected weekly from 3 pens in South Zone with those from 3 pens in North Zone, all pens at zero miles from fly-drop lanes.

FIG. 48. Comparison of egg masses collected weekly from 3 pens in South Zone with those from 3 pens in North Zone, all pens 6 miles from nearest drop lanes. Solid lines = total screw-worm egg masses; dotted lines = fertile screw-worm egg masses.

Mrs McDuffie

Mr. McDuffie Screw-worm

Report of Poza Rica test

February 17, 1966

B. G. Hightower
Entomologist in Charge
Livestock Insects Investigations
Mission, Texas

Now that the test at Poza Rica has been completed, I would like to urge Dr. Davis to revise his progress report so as to include all of the data obtained from the test. Because of the importance of the test and the interest of other agencies in the results, I suggest that a special report be prepared. This report could be very similar to Special Report K-67, "Seasonal Incidence of Screw-Worms, Cochliomyia hominivorax (Coquerel), in Northern Mexico," which you prepared in 1964.

You and Dr. Davis might also consider including the 1964 Poza Rica test in the same write-up. I will leave this matter to your judgment.

O H Graham

O. H. Graham
Investigations Leader
Livestock Insects Investigations

cc:
W. C. McDuffie

Report on Puerto Rico test

B. D. Griffiths
Bacteriologist in charge
Foreign Animal Disease Investigations
Plum Island, Orient, New York

Now that the test at Puerto Rico has been completed, I would like to have Dr. Davis to review his progress report so as to include all of the data obtained from the test. Because of the importance of the testing the inoculant of other species in the results, I suggest that a special report be prepared. This report could be very similar to Special Report #-1, Immunal Incidence of Hoof-and-Mouth Conditions in Mexico (Report on Mexico "Exico," which you prepared in 1954.

You can Dr. Davis might also consider including the 1954 Puerto Rico test in the same write-up. I will leave this matter to your judgment.

C. A. Graham
Investigations Leader
Livestock Insect Investigations

cc:
R. J. Lechoffie

FEB 28 1966

UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

Animal Health Division
Screwworm Eradication Activities
Vallarta 1 - 901A
México 4, D. F.

February 24, 1966

To: Dr. O. H. Graham
Investigations Leader
Livestock Insects Investigations
ERD, ARS, USDA, Kerrville, Texas

From: Robert S. Sharman
Veterinarian in Charge

Subject: Large-cage screwworm tests at Iguala, Guerrero

I refer to your letter of February 17 and attachments, concerning screwworm research at Iguala. I believe we can come up with a letter here to the Mexican officials and obtain a prompt reply. Copies of both pieces of correspondence could then serve as a basis for conducting the test you referred to at Iguala.

Although we have an exchange of correspondence between Washington and SAG regarding our ANH screwworm work here, we do not have anything in writing about the other tests that have been conducted. They have been approved by word of mouth. I agree with you that it would be prudent to have something in writing for the Iguala studies. I shall prepare a letter in keeping with the information in your letter, and try to arrange for Dr. Villaseñor to get something back in writing from Dr. Fernández de Castro. Neither Dr. Villaseñor nor Dr. Fernández de Castro is a research man, but since we are working so closely with them, I think their concurrence and participation in the undertaking would be the most convenient arrangement. By participation, I mean keeping up to date with what is going on in Iguala, but not actually assigning someone to work with you there.

I shall hold off taking final action with Dr. Villaseñor until I have heard from you, indicating whether or not this will be satisfactory with you.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Animal Health Division
Screwworm Eradication Activities
Vallarta 1 - 901A
México 6, D. F.

February 24, 1966

To: Dr. O. H. Graham
Investigations Leader
Livestock Insects Investigations
ENT, ARS, USDA, Kerrville, Texas

From: Robert S. Sherman
Veterinarian in Charge

Subject: Large-cage screwworm tests at Iguala, Guerrero

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Mr. McDuffie
Screw-worm

Large-cage screw-worm tests at Iguala, Guerrero

February 17, 1966

R. S. Sharman, Co-Director
Comision Mexico-Americana para
La Prevencion de La Fiebre Aftosa
Mexico, D. F.

Enclosed for your information are copies of recent correspondence between Dr. T. B. Davich and me. You will note that in his memorandum of February 11, Dr. Davich suggests that we obtain formal concurrence of appropriate officials in Mexico before initiating any screw-worm research at Iguala. This is, of course, a very prudent suggestion, but I am not quite sure as to how I should request this concurrence. Do you already have formal authorization from SAG for the surveys and tests which have already been conducted. If so, would it be possible for us to supply Dr. Welch with a copy of this authorization or agreement?

If we can do so, it might be better for us to obtain a statement from someone in SAG in which they specifically concur with the conduct of tests at Iguala. Could you request such a letter, or do you feel that it would be better for me to write to SAG officials asking for their concurrence?

We hope to begin at Iguala by releasing irradiated screw-worm flies from the Mission plant in the cage and observing their behavior under those conditions. At a later date, we will probably want to release both untreated fertile flies and chemosterilized flies inside the cage. These studies, of course, would depend on the availability of a colony of screw-worm flies in Mexico. There is also a possibility that our research people at Mission will want to conduct tests with attractants in the large cage. Attractant tests would probably also involve the use of fertile screw-worm flies.

Any comments or suggestions which you may have concerning the proposed undertaking will be very much appreciated.

O H Graham

O. H. Graham
Investigations Leader
Livestock Insects Investigations

Enclosures

cc: W. C. McDuffie
T. B. Davich
B. G. Hightower

Large-cage screw-worm tests at Iguala, Guerrero

February 17, 1956

R. E. Barnum, Co-director
Comision Mexico-Americana para
La Erradicacion de La Fiebre Aftosa
Mexico, D. F.

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Any comments or suggestions which you may have concerning the proposed undertaking will be very much appreciated.

O. H. Graham
Investigations Leader
Livestock Insects Investigations

Enclosures

cc: H. G. McDuffie
T. R. Davich
R. C. Hightower

Mr. McDuffie Screwworm

Field work in Mexico

February 24, 1966

B. G. Hightower
Entomologist in Charge
Livestock Insects Investigations
Mission, Texas

I have delayed replying to your memorandum of February 2 on this subject until I had definite information on our travel ceiling for the balance of the fiscal year. We are [redacted] informed that our travel ceiling will remain virtually unchanged. Unless the requirements for travel in Mexico are considerably heavier than either of us anticipates at this time, our travel ceiling should be adequate to cover everything outlined in your memorandum.

It will not be necessary, as I see it, nor desirable for either Dr. Fletcher or Dr. Crystal to turn their tests over to Dr. Davis. We could not expect Dr. Davis to conduct these tests with the same insight as the entomologists who have had several years of experience on these projects. Also, I would not like for Dr. Davis to have to interrupt or perhaps even abandon his own very important research program.

I have wanted to visit with you at Mission for a month now, but have postponed the trip because of a number of conflicts. I hope to be down there sometime during the week of March 7, and will make more definite arrangements with you next week.

O H Graham

O. H. Graham
Investigations Leader
Livestock Insects Investigations

cc:
W. C. McDuffie

Field work in Mexico

B. G. Kightower
Entomologist in Charge
Livestock Insects Investigations
Mission, Texas

February 24, 1956

I have delayed replying to your memorandum of February 2 on this subject until I had definite information on our travel ceiling for the balance of the fiscal year. We are now informed that our travel ceiling will remain virtually unchanged. Unless the requirements for travel in Mexico are somewhat heavier than either of us anticipates at this time, our travel ceiling should be adequate to cover everything outlined in your memorandum.

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G. E. Graham
Investigations Leader
Livestock Insects Investigations

cc:
W. C. Mourikis

Screwworm

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
METABOLISM AND RADIATION RESEARCH LABORATORY
STATE UNIVERSITY STATION
FARGO, NORTH DAKOTA 58103

February 28, 1966

To: W. C. McDuffie, Chief, Insects Affecting Man and Animals Research Branch, ENT, ARS, USDA
Plant Industry Station
Beltsville, Maryland 20705

From: R. C. Bushland, Laboratory Director

Subject: Screwworm fly quality and screwworm field tests in Mexico in 1966

This concerns your letter of February 11 to Dr. Graham with carbon copies to Dr. Hightower and me. I am sending copies of this memorandum to Drs. Knipling, Graham, and Hightower. In your memorandum of February 11 you suggested that Dr. Graham should tell the program people that Dr. Knipling favored all meat rearing until hydroponic flies were proved equal.

This subject came up at the joint conference last July. I believe Dr. Hightower was present for the discussion, but I think Dr. Graham had already left the meeting for a trip to Mexico. The ANH people brought out that just a month or so earlier they had purchased a whole year's supply of ingredients for liquid rearing, using the funds available at the end of the preceding fiscal year. They also emphasized that the budget for the current fiscal year was extremely tight and that switching to all meat rearing would be extremely difficult from the budget viewpoint.

Dr. Knipling said that in view of those considerations he would go along with half liquid-reared and half meat-reared flies, providing that the production was mixed so that both types of flies were released together.

The the December 15 conference, Dr. Mulhern again raised the question about hydroponic flies. I think that he brought up this point because we had earlier discussed the poor performance of hydroponic

February 28, 1966

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The the December 15 conference, Dr. Mulhern again raised the question about hydroponic flies. I think that be brought up this point because we had earlier discussed the poor performance of hydroponic

flies in the Poza Rica field test. Being mindful of Dr. Knipling's comments last July, and knowing that the budget was still tight, I said that our Division still favored 50-50 production with the flies mixed before release. This was reported on pages 8 and 9 of the minutes of the December 15 conference.

Since ANH does not have enough money to switch over completely to horse meat rearing and the ingredients for hydroponic rearing are already bought and paid for, I see no harm in putting out the 50-50 mixture of flies. This costs very little more than cutting in half the fly rearing and releasing horse meat flies only at half the present rates over the same flight lanes.

R. C. Bushland

cc: E. F. Knipling
O. H. Graham
B. G. Hightower

Flies in the Pons Mica field test. Being mindful of Dr. Knipling's comments last July, and knowing that the budget was still tight, I said that our Division still favored 50-50 production with the flies mixed before release. This was reported on pages 8 and 9 of the minutes of the December 15 conference.

Since ARS does not have enough money to switch over completely to horse meat rearing and the ingredients for hydroponic rearing are already bought and paid for, I see no harm in putting out the 50-50 mixture of flies. This costs very little more than cutting in half the fly rearing and releasing horse meat flies only at half the present rates over the same flight lanes.

cc: K. P. Knipling
O. H. Graham
B. C. Hightower

Screwworm

MAR 2 1966

JFD
LBR
RRR

February 28, 1966

To: W. C. McDuffie, Chief, Insects Affecting Man and Animals Research Branch, ENT, ARS, USDA
Plant Industry Station
Beltsville, Maryland 20705

Insects Affecting

MAR 4 1966

From: R. C. Bushland, Laboratory Director

Subject: Screwworm fly quality and screwworm field tests in Mexico in 1966

This concerns your letter of February 11 to Dr. Graham with carbon copies to Dr. Hightower and me. I am sending copies of this memorandum to Drs. Knipling, Graham, and Hightower. In your memorandum of February 11 you suggested that Dr. Graham should tell the program people that Dr. Knipling favored all meat rearing until hydroponic flies were proved equal.

This subject came up at the joint conference last July. I believe Dr. Hightower was present for the discussion, but I think Dr. Graham had already left the meeting for a trip to Mexico. The ANH people brought out that just a month or so earlier they had purchased a whole year's supply of ingredients for liquid rearing, using the funds available at the end of the preceding fiscal year. They also emphasized that the budget for the current fiscal year was extremely tight and that switching to all meat rearing would be extremely difficult from the budget viewpoint.

Dr. Knipling said that in view of those considerations he would go along with half liquid-reared and half meat-reared flies, providing that the production was mixed so that both types of flies were released together.

The the December 15 conference, Dr. Mulhern again raised the question about hydroponic flies. I think that he brought up this point because we had earlier discussed the poor performance of hydroponic

February 28, 1966

To: W. C. McDuffie, Chief, Insects Affecting Man and Animals Research Branch, ENT, ARS, USDA
Plant Industry Station
Beltsville, Maryland 20705

From: R. O. Bushland, Laboratory Director

Subject: Screwworm fly quality and screwworm field tests in Mexico in 1966

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The the December 15 conference, Dr. Mulhern again raised the question about hydroponic flies. I think that he brought up this point because we had earlier discussed the poor performance of hydroponic

flies in the Poza Rica field test. Being mindful of Dr. Knipling's comments last July, and knowing that the budget was still tight, I said that our Division still favored 50-50 production with the flies mixed before release. This was reported on pages 8 and 9 of the minutes of the December 15 conference.

Since ANH does not have enough money to switch over completely to horse meat rearing and the ingredients for hydroponic rearing are already bought and paid for, I see no harm in putting out the 50-50 mixture of flies. This costs very little more than cutting in half the fly rearing and releasing horse meat flies only at half the present rates over the same flight lanes.

cc: E. F. Knipling
O. H. Graham
B. G. Hightower

R. C. Bushland

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cc: E. F. Knipling
O. H. Graham
D. G. Hightower

W. C. McDuffie

FEB 28 1966 R.C. Bushland

February 11, 1966

To: O. H. Graham, Kerrville

From: W. C. McGuffie, Chief, Insects Affecting Man and Animals Research Branch

Subject: Report of Pecos Rice Test

Reference is made to your letter of January 13 transmitting Dr. Davis' report on the subject test and your analysis of the results.

From my point of view it is very difficult to make any definite conclusion from the results of the test. The first part strongly suggested that the most reared flies were superior but we need similar results after the shift to really tie this down. Unfortunately, weather conditions and other factors apparently wrecked any chances of confirmation.

I referred the entire record to Dr. Knipling and here are his comments.

"This is enough to convince me that we should raise the best flies possible. Also, we need to consider possible changes in behavior and should not use too wide sexes for releases. There is a big difference between 17% and 6% in a program even though statistically, it may be difficult to show significant differences."

W. C. McGuffie

cc:
D.S.Hightower
R.C.Bushland

February 19, 1956

To: G. R. Cretens, Berryville

From: E. E. Moffitt, Chief, Insects Affecting Man and Animals
Research Branch

Subject: Report of Fume Kill Test

Reference is made to your letter of January 13 transmitting Mr. Hoff's report on the subject test and your analysis of the results.

From my point of view it is very difficult to make any definite conclusions from the results of the test. The first part strongly suggested that the most recent films were superior but on most similar results after the shift to really six kills dead. Unfortunately, weather conditions and other factors apparently masked any chances of conclusions.

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E. E. Moffitt

mar
E.E.Moffitt
R.E.Dunham

R.C. Bushland

February 11, 1966

To: G. R. Graham, Kerrville

From: W. C. McGuffie, Chief, Insects Affecting Man and Animals Research Branch

Subject: Screw-worm fly quality and screw-worm field tests in Mexico in 1966

Reference is made to your two letters of January 20 on the above subjects. These were referred to Dr. Knipling for his comments. A copy of his comments are attached and one is also being sent to Dr. Hightower.

Dr. Knipling's letter clearly indicates his concern over the quality of flies being released. However, I have also discussed this matter with him and can assure you that his letter does not really reflect his much deeper concern in this matter. He would like to know just what your feeling on the matter is and what if anything is being done at the program level to improve fly quality. I told him I did not know for sure what the program people were doing but I believed they were rearing about half of the flies on liquid media and half on meat. It is obvious from the 3rd paragraph of his letter that he favors all meat rearing until such time as the efficiency of the liquid media-reared flies have been shown to be equal to that of meat reared flies.

This is a rather delicate matter to discuss with the program people but you may think it wise to do so. In any event we would like information on the current situation and what might be projected for the future.

We really do not feel competent to comment on the occurrence of mutants in the field larval samples. However, we feel as you do that the matter needs to be investigated along the lines you mentioned. In this connection, I would like to know just what procedures are now followed in the quality control section. At one time I believe this activity was dropped or virtually so and then resumed. I have no information at all on current procedures, but I feel strongly that quality control is highly important and should be a continuing activity.

W. C. McGuffie

Enclosure
cc: (w/cy encl)
R.C.Bushland
D.S.Hightower

February 11, 1966

To: G. M. Grahm, Sarville

From: W. E. Mahaffie, Chief, Insects Affecting Man and Animals
Research Branch

Subject: Screw-worm fly quality and eradication field tests in Mexico in 1965

Reference is made to your two letters of January 20 on the above subject. These were referred to Dr. Spalding for his comments. A copy of his comments are attached and one is also being sent to Dr. Kightower.

Dr. Spalding's letter clearly indicates his concern over the quality of flies being released. However, I have also discussed this matter with him and can assure you that his letter does not really reflect his much deeper concern in this matter. He would like to know just what your feeling on the matter is and what if anything is being done at this program level to improve fly quality. I told him I did not know for sure what the program people were doing but I believed they were working about half of the flies on liquid media and half on meat. It is obvious from the 3rd paragraph of his letter that he favors all meat rearing until such time as the efficiency of the liquid media-reared flies have been shown to be equal to that of meat reared flies.

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Sincerely

GCI (Gary Gall)
S.C.Smallwood
R.A.Kightower

Mr. McDuffie Screwworm

KERRVILLE, TEXAS

Large-cage screw-worm tests at Iguala, Guerrero

Don R. Lindquist
Yet back

Robert S. Sharman
Veterinarian in Charge
Screw-Worm Eradication Activities, ANH
Mexico, D. F.

February 28, 1966

Thank you for your memorandum of February 24 on this subject. You have suggested what appears to me to be the most practical method of arranging for the proposed studies at Iguala. I agree that it would be both appropriate and diplomatic to invite Dr. Fernandez de Castro and Dr. Villasenor to participate in the studies. We would also be entirely agreeable to their participation as co-authors of any publications which result from the tests conducted in cooperation with them. It will be very much appreciated if you will proceed as outlined in your memorandum.

As always, we appreciate very much the advice and guidance which you are able to give us concerning our activities in Mexico.

O H Graham

O. H. Graham
Investigations Leader
Livestock Insects Investigations

cc:
W. G. McDuffie
T. B. Davich
B. G. Hightower

Gusmano

Martinsville, Indiana

Large-cage screw-worm basis at Tuxtla, Guerrero

Robert E. Shannon
Veterinarian in Charge
Screw-Worm Eradication Activities, ASM
Mexico, D. F.

February 22, 1965

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G. H. Graham
Investigations Leader
Livestock Insects Investigations

cc:
W. H. Sugrue
R. B. Davich
H. G. Hightower

AD-514
(1-60)

REFERENCE SLIP

U.S. DEPARTMENT OF AGRICULTURE

DATE 3/21/66

REFERRED TO

Mr. McDuffie

- [ ] ACTION
- [ ] NOTE AND FILE
- [ ] APPROVAL
- [ ] NOTE AND RETURN
- [ ] AS REQUESTED
- [ ] RECOMMENDATION
- [ ] FILING
- [ ] REPLY FOR SIGNATURE OF
- [ ] FOR COMMENT
- [ ] SEE ME
- [ ] FOR INFORMATION
- [ ] YOUR SIGNATURE

REMARKS Attached is translation of copy of letter received at Kerrville March 21.

Insects Affecting Man & Animals

MAR 23 1966

W.C.M.
~~D.E.W.~~
J.A.F.

O. H. Graham (v.2.)
(NAME OF SENDER)

GPO : 1960 OF—540756

Attached is translation of copy of letter received at Kerrville March 21.

Screwworm

TRANSLATION

March 14, 1966

Dr. Gabriel Fernandez de Castro
Director General of Animal Health
Secretariat of Agriculture and
Livestock Production
Aquiles Serdan No. 28
Mexico, D. F.

Dear Dr. Fernandez de Castro:

For the purpose of undertaking intensive studies of attractive substances and chemosterilants for screw-worm flies, Drs. Graham and Davis are thinking of coming to Mexico and locating at Iguala, Guerrero. At that place they will release flies in a cage and will make the studies.

The above mentioned doctors have entrusted us to inform you of their plans and solicit your written authorization for carrying out the project, since the cage to which we refer is located on property rented by a commission which studies cotton pests, and they request said authorization in order that they can use the installation.

At the same time they invite you to participate in the study as a co-author of all the publications which may be prepared concerning the study.

In appreciation of your consideration of this matter we remain at your service,

M.V. H. C. Beasley
Representante del Departamento de
Agricultura de los EE. UU.

M.V. M. A. Villasenor
Representante de la Sria.
de Agricultura y Ganaderia

March 14, 1966

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Secretariat of Agriculture and
Livestock Production
Aquilas Section No. 28
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M.V. M. A. Villaseñor
Representante de la Secretaría
de Agricultura y Ganadería

Talked to Graham on phone 3/22/66 D.C.W.

Mc:

If you talk to Graham

please indicate that I would go

along with 50-50 as agreed

last year. My mind on reviewing

does indicate that I favor all Hawaii that

visual insects and I really do, but from

budgetary standpoints I would go along with

50-50 provided they are material. Stan

xxx 986
xxxxxxxxxxxxxxxxxxxxx
Mission, Texas 78572

March 22, 1966

To: W. C. McDuffie, Chief
Insects Affecting Man & Animals
Research Branch
Beltsville, Md.

Through: O. H. Graham, Investigations Leader
Kerrville, Texas

From: B. G. Hightower
Entomologist in Charge

Subject: Increased ecological research in Mexico

Dr. Graham recently visited Mission and reviewed the research on screw-worms being conducted by this laboratory and the Methods Development Section of ANH. He is concerned about the lack of data on the behavior of plant-reared flies in the field, and I share his concern.

The effectiveness of released flies can be impaired by loss of sexual vigor, loss of mobility, or a general decline in viability. These may simply reflect the effects of prolonged colonization. Field tests are difficult, expensive, and frequently unrewarding, but this remains the only means of determining the effectiveness of the released flies.

If the Screwworm Eradication Program continues to expand in Mexico, the need for more kinds of field tests will increase. Dr. Davis is doing an excellent job, but more professional manpower is needed to continue and expand critical ecological research. I submit that I would contribute more to the overall research effort in support of the Eradication Program by returning to the field. Therefore, I am sending the enclosed proposal for your consideration.

xxx 986
xxxxxxxxxxxxxxxxxxxx
Mission, Texas 78572

March 22, 1966

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Research Branch
Beltsville, Md.

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Kerrville, Texas

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Proposal for Field Studies in Mexico on the Mobility of Released Sterile Screw-Worm Flies

by

B. G. Hightower

Objective:--To determine the patterns of dispersal in time and space of released sterile screw-worm flies in relation to climate and terrain.

Sterile screw-worm flies are currently being released in many areas in Mexico where the only means of evaluating the effectiveness of the flies is based on the number of cases of screw-worms reported by livestock owners. The ability of these released flies to initially disperse into and move between centers of local populations of flies is unknown. If there are differences in mobility between released and native populations of flies within the range of environmental conditions encompassed by the present control zone then release rates, altitudes of release, and swath widths must be adjusted accordingly. It is difficult to draw valid conclusions from tests such as the ones in Poza Rica and Sinaloa until this possible source of variation has been investigated in tests designed solely for this purpose.

Procedure:--In order to conduct these studies, it will be necessary to locate bolsons, canyons, or water courses surrounded by arid areas. By using such isolated areas, some of the difficulties in tracing fly movements in extensive favorable environments can be avoided, and interference from other local populations of flies can be minimized.

Proposal for Field Studies in Mexico on the Mobility
of Released Sterile Screw-Worm Flies

by

E. G. Bishopp

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Procedure:--In order to conduct these studies, it will be necessary to locate bolsons, canyons, or water courses surrounded by arid areas. By using such isolated areas, some of the difficulties in tracing fly movements in extensive favorable environments can be avoided, and interference from other local populations of flies can be minimized.

In the first phase of this investigation, sterile flies will be released on the ground at a specified point. Traps will be operated at different distances from the release point, and these will be baited and emptied at specific intervals after the flies have been released. The trapping area required to adequately measure the rate of dispersal of the flies will have to be determined by inspection, but all the traps will be initially placed within 5 kilometers of the release point. Dispersal in relation to terrain features or vegetation will be studied by varying the locations of the traps at the same distances from the release point. Weather observations will be made during all tests and an effort will be made to correlate climatic changes with test results.

After the preliminary trapping studies have been completed, sterile flies marked with fluorescent dye will be released and night searches made to supplement the data on dispersal obtained by trapping. Night searches for marked flies are more effective than traps for investigating dispersal rates of male flies. All previous assumptions on the movements of male flies have been inferred from trap catches of female flies.

In the second phase of this project, marked sterile flies will be released from airplanes on flight lanes up to 6 miles away from the trapping area. By plotting fly recoveries against the distance from the release line, limits can be set on the maximum swath width which will still enable flies to reach any area between release lines. Ancillary data of this sort are needed to interpret the results of tests of swath widths based only on collections of sterile egg masses.

In the first phase of this investigation, sterile flies will be released on the ground at a specified point. Traps will be operated at different distances from the release point, and these will be baited and emptied at specific intervals after the flies have been released. The trapping area required to adequately measure the rate of dispersal of the flies will have to be determined by inspection, but all the traps will be initially placed within 3 kilometers of the release point. Dispersal in relation to terrain features or vegetation will be studied by varying the locations of the traps at the same distances from the release point. Weather observations will be made during all tests and an effort will be made to correlate climatic changes with test results.

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After sufficient data have been obtained on Florida strain flies reared on horsemeat, additional tests will be conducted on flies of this strain reared on liquid media as well as Mexican strain flies from both of the above sources.

UNITED STATES DEPARTMENT OF AGRICULTURE

(Issued in Mexico City, March 22)

Washington, March 24, 1966

Screwworm Eradication Proposals Discussed at U.S. - Mexico Meeting:

At a meeting today (March 22) of representatives of the U.S. Department of Agriculture and the Ministry of Agriculture and Livestock of Mexico, proposals were presented by the livestock producers of the 2 countries to extend the responsibilities of the Mexican-United States Commission for the Prevention of Foot-and-Mouth Disease to cover screwworm activities and to develop a program for the eradication of this pest in Mexico.

Presiding at the meeting, which was held at the headquarters of the National Cattlemen's Confederation, were Manuel Guzman Willis, Mexico's Sub-Secretary for Livestock, and George L. Mehren, U.S. Assistant Secretary of Agriculture. Technical advisors from both government agencies, and representatives of the livestock industries of each country, also attended.

The meeting opened with a discussion of the joint declaration by Mexican and U.S. livestock producers, requesting their respective governments to set up a joint commission for screwworm eradication.

Dr. Gabriel Fernandez de Castro, Mexico's Director of Animal Health, and Dr. Robert S. Sharman, USDA representative in Mexico, presented a preliminary report of conclusions drawn to date from the screwworm survey now under way in Mexico.

Both agreed that in Mexico cold weather during the winter is not sufficiently intense or prolonged to kill off screwworms, as is the case in most of the territory in the U.S. where previous campaigns against screwworms have been carried out. They added that perhaps the dry season may assist eradication operations by reducing screwworm populations. However, both technicians agreed that screwworm eradication in Mexico is technically feasible.

2291 (more) USDA 911-66

On behalf of the National Cattlemen's Confederation, its President, Octavio Ochoa Ochoa, said that during a recent assembly of this organization, a resolution was passed whereby the Mexican livestock producers expressed their willingness to make a per head assessment on every animal exported, or sold within the country. Mr. Ochoa said that members also were agreed that if in the course of the screwworm eradication program additional funds were required, they would increase their contributions.

The U.S. livestock producers, headed by Dolph Briscoe, Uvalde, Texas, president of the Southwest Animal Health Research Foundation, commended the attitude of their Mexican colleagues, and offered their full support to the eradication campaign, which has greatly benefited the U.S. livestock industry.

Mr. Mehren, referring to the 2 proposals which resulted from this meeting, offered to affirmatively and constructively present them to his government. For his part, Mr. Guzmán Willis said that the Mexican Government will give full support to the extension of the activities of the Mexican-U.S. Commission for the Prevention of Food-and-Mouth Disease, and the development of a program for screwworm eradication in Mexico.

The technicians who will be in charge of preparing such a program stated that this will be made public as soon as the results of the survey of screwworm incidence in Mexico now under way are fully known and evaluated.

Those seated on the rostrum included Elmer Mostow, USDA Office of General Counsel; Miguel Vargas Solórzano, executive officer for Mexico's Sub-Secretary for Livestock; F.J. Mulhern, director of the Animal Health Division, USDA Agricultural Research Service; Gabriel Fernández de Castro, Mexico's Director of Animal Health; U.S. Assistant Secretary of Agriculture Mehren; Manuel Guzmán Willis, Mexico's Sub-Secretary for Livestock; Robert J. Anderson and Francis Mangham, deputy administrators, USDA Agricultural Research Service; Gabriel Atristain, Mexican Government veterinarian; M.R. Clarkson, director, Bureau of Veterinary Medicine, Food and Drug Administration, U.S. Department of Health, Education, and Welfare; John Scholl, U.S. Agricultural Attache for Mexico; and Albert K. Mitchell, Albert, New Mexico, rancher and member, advisory committee to the U.S. Department of Agriculture on foot-and-mouth disease.

Representatives of the Mexican livestock producers, headed by the president of the National Cattlemen's Confederation, Octavio Ochoa Ochoa, included José Aurelio Ayala, Gustavo Garrido Canabal, and Luis Jaime Tamayo. U.S. livestock producers were represented by Dolph Biscoe, Charlie Scruggs, T.J. Richards, and John Hays.

- - - - - - - - - -

USDA 911-66

Screwworm

AS FORM 114 (12-61)
UNITED STATES GOVERNMENT

Memorandum

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Entomology Research Division
Kerrville, Texas

SUBJECT: Increased ecological research in Mexico on screw-worms

TO: W. C. McDuffie, Chief
Insects Affecting Man and
Animals Research Branch
Beltsville, Maryland

DATE: March 25, 1966

The attached memorandum and research proposal from Dr. Hightower are self-explanatory. We have all been interested in the size, longevity, vigor, mating ability, and other characteristics of the sterile-male screw-worm flies currently produced at Mission. These aspects of fly quality are evaluated both by ANH and ERD personnel within the limits of the personnel and facilities available on a more or less routine basis. The ability of the irradiated flies to disperse or move about in the field has received less attention, mainly because of the technical and administrative difficulties involved. Dr. Hightower's proposal seems to me to be very practical; I believe such studies are within our capabilities and that they will yield considerable information of value to the present and future programs.

While we have no objective data directly supporting such a conclusion, there have been a number of observations which suggested that a substantial proportion of the flies produced in the past were more sessile than normal flies and inclined to move about as little as possible. The expanded research should tell us whether or not currently produced flies move about in a Mexican habitat to the same extent that flies produced in 1962 moved about in Texas habitats.

Dr. Hightower proposes and I recommend that he devote considerable personal effort to the proposed ecological research. As Entomologist in Charge of the Mission laboratory, he has devoted much of his time to administrative and supervisory tasks since Mr. Baumhover's departure. Personnel Division does not recognize that the scientist in charge must use so much of his time in this way, but we all know that activities of the group as a whole would come to a halt unless someone "takes care of the store."

We have outlined research in Mexico for all four of the professionals at Mission, and it is conceivable that all four might need to be away from the laboratory at the same time. I doubt that this eventuality will arise; I think that the program can be arranged so that the periods when no professional is present at Mission will be at most very brief.

Entomology Research Division
Kerrville, Texas

Increased ecological research in Mexico on screw-worms

March 25, 1960

W. G. McGuire, Chief
Insects Affecting Man and
Animals Research Branch
Beltsville, Maryland

The attached memorandum and research proposal from Dr. Hightower are self-explanatory. We have all been interested in the size, longevity, vigor, mating ability, and other characteristics of the screwfly-male screw-worm flies currently produced at Mission. These aspects of fly quality are evaluated both by ARS and CMD personnel within the limits of the personnel and facilities available on a more or less routine basis. The ability of the irradiated flies to disperse or move about in the field has received less attention, mainly because of the technical and administrative difficulties involved. Dr. Hightower's proposal seems to me to be very practical; I believe such studies are within our capabilities and that they will yield considerable information of value to the present and future programs.

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Dr. Hightower proposes and I recommend that he devote considerable personnel effort to the proposed ecological research. As Entomologist in Charge of the Mission laboratory, he has devoted much of his time to administrative and supervisory tasks since Mr. Baumhover's departure. Personnel Division does not recognize that the scientist in charge must use so much of his time in this way, but we all know that activities of the group as a whole would come to a halt unless someone "takes care of the store."

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It seems unlikely that it will be necessary for Dr. Crystal to be in Mexico for prolonged periods within the near future, and I anticipate that he will be Acting in Charge during most of the time that Dr. Hightower is away. Drs. Davis and Fletcher are each also capable of assuming the administrative duties at Mission if called upon to do so.

I feel that the proposed tests are urgently needed and recommend that we ask Dr. Hightower to proceed with them as soon as possible.

O H Graham

O. H. Graham
Investigations Leader
Livestock Insects Investigations

Attachment

In duplicate

cc:
B. G. Hightower

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O. H. Graham
Investigations Leader
Livestock Insects Investigations

Attachment

In duplicate

cc:
B. G. Hightower

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box ~~2282~~ 986
~~KERRVILLE, TEXAS 78028~~
Mission, Texas 78572

March 22, 1966

To: W. C. McDuffie, Chief
Insects Affecting Man & Animals
Research Branch
Beltsville, Md.

Through: O. H. Graham, Investigations Leader
Kerrville, Texas

From: B. G. Hightower
Entomologist in Charge

Subject: Increased ecological research in Mexico

Dr. Graham recently visited Mission and reviewed the research on screw-worms being conducted by this laboratory and the Methods Development Section of ANH. He is concerned about the lack of data on the behavior of plant-reared flies in the field, and I share his concern.

The effectiveness of released flies can be impaired by loss of sexual vigor, loss of mobility, or a general decline in viability. These may simply reflect the effects of prolonged colonization. Field tests are difficult, expensive, and frequently unrewarding, but this remains the only means of determining the effectiveness of the released flies.

If the Screwworm Eradication Program continues to expand in Mexico, the need for more kinds of field tests will increase. Dr. Davis is doing an excellent job, but more professional manpower is needed to continue and expand critical ecological research. I submit that I would contribute more to the overall research effort in support of the Eradication Program by returning to the field. Therefore, I am sending the enclosed proposal for your consideration.

B. G. Hightower

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B. G. Hightower

Proposal for Field Studies in Mexico on the Mobility of Released Sterile Screw-Worm Flies

by

B. G. Hightower

Objective:--To determine the patterns of dispersal in time and space of released sterile screw-worm flies in relation to climate and terrain.

Sterile screw-worm flies are currently being released in many areas in Mexico where the only means of evaluating the effectiveness of the flies is based on the number of cases of screw-worms reported by livestock owners. The ability of these released flies to initially disperse into and move between centers of local populations of flies is unknown. If there are differences in mobility between released and native populations of flies within the range of environmental conditions encompassed by the present control zone then release rates, altitudes of release, and swath widths must be adjusted accordingly. It is difficult to draw valid conclusions from tests such as the ones in Poza Rica and Sinaloa until this possible source of variation has been investigated in tests designed solely for this purpose.

Procedure:--In order to conduct these studies, it will be necessary to locate bolsons, canyons, or water courses surrounded by arid areas. By using such isolated areas, some of the difficulties in tracing fly movements in extensive favorable environments can be avoided, and interference from other local populations of flies can be minimized.

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In the first phase of this investigation, sterile flies will be released on the ground at a specified point. Traps will be operated at different distances from the release point, and these will be baited and emptied at specific intervals after the flies have been released. The trapping area required to adequately measure the rate of dispersal of the flies will have to be determined by inspection, but all the traps will be initially placed within 5 kilometers of the release point. Dispersal in relation to terrain features or vegetation will be studied by varying the locations of the traps at the same distances from the release point. Weather observations will be made during all tests and an effort will be made to correlate climatic changes with test results.

After the preliminary trapping studies have been completed, sterile flies marked with fluorescent dye will be released and night searches made to supplement the data on dispersal obtained by trapping. Night searches for marked flies are more effective than traps for investigating dispersal rates of male flies. All previous assumptions on the movements of male flies have been inferred from trap catches of female flies.

In the second phase of this project, marked sterile flies will be released from airplanes on flight lanes up to 6 miles away from the trapping area. By plotting fly recoveries against the distance from the release line, limits can be set on the maximum swath width which will still enable flies to reach any area between release lines. Ancillary data of this sort are needed to interpret the results of tests of swath widths based only on collections of sterile egg masses.

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After sufficient data have been obtained on Florida strain flies reared on horsemeat, additional tests will be conducted on flies of this strain reared on liquid media as well as Mexican strain flies from both of the above sources.

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Orig to Knapp 3/30

Entomology Research Division
Kerrville, Texas

Increased ecological research in Mexico on screw-worms

W. C. McDuffie, Chief
Insects Affecting Man and
Animals Research Branch
Beltsville, Maryland

March 25, 1966

The attached memorandum and research proposal from Dr. Hightower are self-explanatory. We have all been interested in the size, longevity, vigor, mating ability, and other characteristics of the sterile-male screw-worm flies currently produced at Mission. These aspects of fly quality are evaluated both by ANH and ERD personnel within the limits of the personnel and facilities available on a more or less routine basis. The ability of the irradiated flies to disperse or move about in the field has received less attention, mainly because of the technical and administrative difficulties involved. Dr. Hightower's proposal seems to me to be very practical; I believe such studies are within our capabilities and that they will yield considerable information of value to the present and future programs.

While we have no objective data directly supporting such a conclusion, there have been a number of observations which suggested that a substantial proportion of the flies produced in the past were more sessile than normal flies and inclined to move about as little as possible. The expanded research should tell us whether or not currently produced flies move about in a Mexican habitat to the same extent that flies produced in 1962 moved about in Texas habitats.

Dr. Hightower proposes and I recommend that he devote considerable personal effort to the proposed ecological research. As Entomologist in Charge of the Mission laboratory, he has devoted much of his time to administrative and supervisory tasks since Mr. Baumhover's departure. Personnel Division does not recognize that the scientist in charge must use so much of his time in this way, but we all know that activities of the group as a whole would come to a halt unless someone "takes care of the store."

We have outlined research in Mexico for all four of the professionals at Mission, and it is conceivable that all four might need to be away from the laboratory at the same time. I doubt that this eventuality will arise; I think that the program can be arranged so that the periods when no professional is present at Mission will be at most very brief.

Entomology Research Division
Harrville, Texas

Increased ecological research in Mexico on screw-worm

March 23, 1966

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It seems unlikely that it will be necessary for Dr. Crystal to be in Mexico for prolonged periods within the near future, and I anticipate that he will be Acting in Charge during most of the time that Dr. Hightower is away. Drs. Davis and Fletcher are each also capable of assuming the administrative duties at Mission if called upon to do so.

I feel that the proposed tests are urgently needed and recommend that we ask Dr. Hightower to proceed with them as soon as possible.

O. H. Graham
Investigations Leader
Livestock Insects Investigations

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In duplicate

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AD-514
(1-60)

U.S. DEPARTMENT OF AGRICULTURE

REFERENCE SLIP

DATE 3/28/66

REFERRED TO

Mr. McDuffie

- [ ] ACTION
- [ ] NOTE AND FILE
- [ ] APPROVAL
- [ ] NOTE AND RETURN
- [ ] AS REQUESTED
- [ ] RECOMMENDATION
- [ ] FILING
- [ ] REPLY FOR SIGNATURE OF
- [ ] FOR COMMENT
- [ ] SEE ME
- [ ] FOR INFORMATION
- [ ] YOUR SIGNATURE

REMARKS We have no travel ceiling for this. We understand that ENT plans to finance this.

Dr. Donald L. Williams
(NAME OF SENDER)

ARS-ANH

GPO : 1960 OF—540756

Screw worm

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ARS-EAD

NNNN

MEX 002

TO USDA ARS ADED DIV HVLE

FM AFTOSA MEXICO

W D C MEX 248 MEXICO D F MARCH 24, 1966

PREPARED BY ORIG OFFICE MARCH 24, 1966.

DR. D. L. WILLIAMS

EMERGENCY ANIMAL DISEASES

ANH, ARS, USDA

WASHINGTON, D. C.

WE ARE TRYING TO COMPARE THE RELATIVE SCREWWORM ABUNDANCE IN THE SURVEY ZONE WITH AREAS IN THE UNITED STATES THAT HAVE BEEN TREATED WITH STERILE FLIES, SO THAT WE CAN CALCULATE THE NUMBER OF STERILE FLIES WHICH WILL BE NEEDED TO ELIMINATE SCREWWORMS IN THE SURVEY ZONE. WE HAVE ALL AGREED HERE THAT WE WOULD LIKE TO REQUEST THE SERVICES OF DR. RICHARD DAVIS ON DETAIL TO THIS OFFICE TO SPEND FULL TIME ON THIS SUBJECT UNTIL SUCH TIME AS WE THINK WE HAVE ARRIVED AT AN ANSWER. SHOULD WE MAKE CONTACT LOCALLY WITH HIS SUPERIORS TO DISCUSS THIS POSSIBILITY, OR WOULD IT BE PREFERABLE, PROVIDED YOU AGREE TO THIS PROPOSAL, TO MAKE CONTACT AT THE WASHINGTON LEVEL?

ROBERT S. SHARMAN

BT

Screw worm

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ENTOMOLOGY RESEARCH DIVISION
P. O. Box 232
KERRVILLE, TEXAS · 78028

March 31, 1966

To: W. C. McDuffie, Chief
Insects Affecting Man & Animals
Research Branch
Beltsville, Md.

From: O. H. Graham
Investigations Leader
Livestock Insects Investigations
Kerrville, Texas

Subject: Cooperation with Animal Health Division in Mexico

After talking to you yesterday about Dr. Sharman's request for Dr. Davis' services for an indefinite period of time I discussed the matter in more detail with Drs. Hightower, Davis, and Sharman. The screw-worm research group is already under-staffed and detailing Dr. Davis to ANH Division for a prolonged period of time would undoubtedly still further reduce the research output of the Mission Laboratory. We would concur with this detail only with the greatest reluctance and only if assured by ANH Division and by you that Dr. Davis could contribute more to the future success of the eradication program in this way than by continuing his current research.

For your information, Dr. Davis is currently working on the following studies which would have to be suspended if he had to go to Mexico City for the next 2 or 3 months:

(1) Life history and behavior studies of Mexican screw-worm flies under natural conditions at Poza Rica, Veracruz. (We have a small cage there and sheep which are used to produce wound-reared flies).

(2) Development of a simulated or artificial "screw-worm-infested animal" for use as a substitute for living animals in population and dispersal studies, attractant research etc.

(3) Assist with the "fly mobility" studies proposed by Dr. Hightower.

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Mr. McDuffie

(4) Studies of auto-intoxication of screw-worm larvae in rearing vats and the development of drip techniques for feeding the larvae, and disposing of the waste products. Hopefully this will contribute to improved rearing procedures, might make use of a liquid medium feasible and contribute to improved designs for any rearing plants which might be built in the future.

(5) Development of objective measurements of fly response to objects, attractive substances etc. (In support of fly behavior and attractant research).

(6) Preparation of a special K-report and three manuscripts for publication.

From his personal viewpoint Dr. Davis is not enthusiastic about the prospect of this new assignment but is willing to undertake it if it would be in the best interest of the program. The assignment would not cause him undue personal hardship if it did not extend beyond July 1, and if he were on per diem for the entire time.

In conversation with Dr. Sharman yesterday we asked for more details of the proposed duties as we wanted some assurance Dr. Davis would not be overburdened with purely clerical work such as compiling and summarizing reports and data. Dr. Sharman agreed that maximum stress should be placed on ecological studies in the field specifically designed to make it feasible to use the case reports and other survey information now being obtained as a basis for estimated probable populations of native flies and requirements for sterile flies. We tentatively agreed it might be useful to study in depth a few representative municipios which have already been surveyed so as to estimate the proportion of reported to unreported screw-worm infestations in southern Mexico. Perhaps a more precise correlation between reported cases and environment (habitat and weather) could also be obtained. A number of administrative problems would have to be solved to obtain the manpower and funds for such studies but we feel that they would almost certainly contribute to the interpretation of survey data already on hand.

As to Dr. Williams' statement that his Division did not have either funds or travel allowance which could be used to support the proposed detail, we feel that you can judge better than we whether or not Entomology Research Division should absorb all the costs. We estimate that Dr. Davis would travel on per diem about half time for the balance of the FY in connection with his current research. It is hard however to believe that ANH Division truely regards the requested assignment as urgent if they are unwilling to underwrite it with funds and travel allowance.

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Livestock Insects Investigations
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